Station News

The Connecticut Agricultural Experiment Station
Volume 6 Issue 6 June 2016

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

DR. THEODORE ANDREADIS presented an invited talk entitled *Mosquitoes and Zika Virus in the Americas: Biology, Ecology and Control*, at a "Zika Global Health Symposium" held at the University of Massachusetts Boston (100 attendees) (May 2-3); participated in a press conference with Congresswoman Rosa DeLauro to express support for federal funding Zika virus research and mosquito control held at the Station (May 5); was interviewed about Zika virus and the risk of mosquito transmission in Connecticut by Fran Schneidau, WCBS Radio, NY (May 6); presented opening welcoming remarks to participants attending the "7th Annual Northeastern Eastern Equine Encephalitis Conference" held at the Station (May 6); the participated in a press conference with Governor Dannel Malloy and Department of Public Health Commissioner, Raul Pino to present an update on Connecticut's "Response and Surveillance Plan for Zika Virus" held at the Hartford Hispanic Community (May 6); presented welcoming remarks and an overview of the Experiment Station and its various research, regulatory and public service programs to attendees of the Federated Garden Clubs of CTs Flower Show School (50 attendees) (May 11); provided opening remarks for the "Lockwood Pavilion Ribbon Cutting Ceremony, held in conjunction with the annual Meeting of the Connecticut Forest & Park Association (100 attendees, May 19); and presented opening remarks and a talk entitled, *Mosquitoes and Zika Virus in the Americas: Biology, Ecology, and Control* in a "Symposium on Vector-Borne diseases in Connecticut (75 attendees) (May 20).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE spoke by phone with Mr. Davis Dunavin (a reporter with WSHU) concerning the recently released CT DEEP report on a study evaluating pesticide levels in Long Island Sound lobsters (May 3); participated in a teleconference call organized by Dr. Byron Brehm-Stecher (Professor at Iowa State University) about participating in a symposium at the upcoming International Association of Food Protection (IAFP) meeting in St. Louis at the end of July (May 3); attended the monthly CT Preparedness meeting at the Department of Public Health Laboratory in Rocky Hill (May 9); participated in the quarterly Northeast Regional FDA FERN teleconference call (May 12); along with **DR. BRIAN EITZER, MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, DR. WALTER KROL, MR. CRAIG MUSANTE, MS. KITTIPATH P.-RIVEROS AND MS. TERRI ARSENAULT** participated in the monthly FDA FERN cCAP teleconference call (May 12); along with **MS. KITTIPATH P.-RIVEROS AND MR. MICHAEL CAVADINI** participated in a monthly FDA AFRPS teleconference call (May 17); met with Dr. James Scott of the University of Toronto and gave a tour of the Analytical Department laboratories and programs (May 19); and attended the SETAC Europe 26th Annual Meeting in Nantes France and gave a platform presentation entitled "Trophic transfer of engineered nanomaterials in terrestrial food chains" (100 attendees) and attended the annual SETAC Nanotechnology Advisory Group meeting in Nantes France and gave a presentation entitled "Nano-related work at the CT Agricultural Experiment Sta-

tion" (25 attendees) (May 22-26, 2016).

DR CHRISTINA S. ROBB presented her career path as an Analytical Chemist and the work performed in the Department of Analytical Chemistry at the STEM high school career fair at Wilbur Cross High School (50 students) (May 19). The event was organized by the Many Mentors group.

DR BRIAN EITZER was a participant in the NACRW organizing committee conference call on May 12 and was a participant in the PI meeting for the SCRI grant entitled "Pollination Security for Fruit and Vegetable Crops in the Northeast" at the University of Massachusetts (20 participants) (May 13).

MR. MICHAEL J. CAVADINI presented information about analytical chemistry and QuEChERS extractions at the North Branford High School Environmental Science Fair (~30 student/5 adult attendees) (May 20).

ENTOMOLOGY

DR. KIRBY C. STAFFORD III spoke on tick-borne diseases and tick bite prevention at StoneRidge retirement community in Mystic, CT (60 attendees) (May 3); spoke on tick-borne diseases and tick management at the Trumbull Public Library sponsored by the local health department, which was recorded by Trumbull Community Television to be available to a wider audience (18 attendees) (May 9); presented a talk on tick-borne diseases and tick management to the Connecticut Audubon Naturalists Program in Fairfield, CT (8 attendees) (May 10); interviewed by Colleen Shaddox from Connecticut Health Investigative Team for a podcast (c-hit.org) (May 11); served on the planning committee and presented a talk on Deer-Targeted Methods-Topical Pesticides, a talk on Integrated Tick/Pathogen Management, and moderated a session at the Integrated Tick Management Symposium in Washington, D.C. (143 attendees) (May 16-17); interviewed by Nala Rogers, Science Writer for The Wildlife Society, about the rodent targeted vaccine study (May 17); participated in a Capstone mentor workshop at Quinnipiac University (May 19); presented a talk on the Prevention and Control of Tick-Borne Diseases at the Symposium on Vector-Borne Diseases in Connecticut in Jones Auditorium (100 attendees) (May 20); interviewed by Trevor Lilly, Redding Pilot, about the tick management projects in Redding, CT (May 20); and participated in the spring meeting of the Cooperative Agricultural Pests Survey (CAPS) committee in Jones Auditorium (12 attendees) (May 31).

With **DRS. SCOTT WILLIAMS** AND **GOUDARZ MOLAEI** and with Dr. Andrew Li at the USDA-ARS, received notice that our USDA-ARS tick management 5-year grant proposal was funded at $150,000 per year.

MR. MARK H. CREIGHTON spoke at the Connecticut Farm Bureau, Youth Farmers Club, on honey bees and their role in pollination at the Valley Lab in Windsor, CT (May 3); was interviewed by Gregory Hladky of the Hartford

Courant on the status of honey bee health in CT (May 11); was interviewed by WSUV-NYC public radio on the status of honey bee health in CT (May 12); was interviewed by Evan White of WFSB 3 in Hartford, CT on the status of honey bee health in CT (May 12); and spoke on honey bees at the Experiment Station to the 1st Grade Class of St Thomas Academy (May 18).

DR. DOUGLAS W. DINGMAN served as a judge for the Connecticut FFA Science Fair (Jones Auditorium) (May 5); conducted an all-day workshop on "Nosema monitoring" for the Backyard Beekeepers Association (Jones Auditorium) (May 14); and served as a judge for the New Haven Science Fair (New Haven) (May 16 and 17).

MS. KATHERINE DUGAS gave a talk about Asian longhorned beetle and winter moth for 8 students as part of a series for the Institute for Learning in Retirement Inc. (May 11); with **MR. JOSEPH P. BARSKY**, **MS. LINDSEY PATRICK**, and **DR. ROBERT MARRA**, had a Station booth at the Connecticut Tree Festival in Norwalk. The CAES tables contained plant pathology and forest pest information (May 21); and organized and ran the Statewide Cooperative Agricultural Pest Survey (CAPS) committee meeting in Jones Auditorium (12 attendees) (May 31).

DR. CHRIS T. MAIER spoke about periodical cicadas and surveys for longhorned beetles during a tour organized by the South Central Connecticut Regional Water Authority at Lake Gaillard in North Branford (May 12).

DR. GALE E. RIDGE was interviewed by CBS News, New York about the Zika virus and native mosquitoes (May 2). An Act Concerning the Rights and Responsibilities of Landlords and Tenants Regarding the Treatment of Bed Bug Infestations passed unanimously by the Connecticut General Assemble Senate at 10:52 PM. The House role call was 112 yea to 35 nay and passed on April 27 at 3:13 PM. Much of the language for the act was written by Attorney Judith R. Dicine member of CCABB with assistance from Dr. Ridge (May 3). Presented a talk in a national CDC webinar about bed bugs and economics (May 4); spoke about bed bugs to Albertus Magnus College Institute of Learning (7 attendees) (May 18); and spoke to the New England Tribes EPA sponsored meeting in Augusta Maine about bed bug behavior, economics, and management. This was followed by field workshop training at a school and apartment complex (25 tribal leaders) (May 19); and was interviewed about the gypsy moth caterpillar outbreak by the New Haven Register (May 31).

DR. CLAIRE E. RUTLEDGE volunteered as a scorekeeper at the Connecticut Tree Climbing Competition, Hartford CT (70 adults) (May 7); presented a talk on the emerald ash borer to the Connecticut Audubon Naturalists Program in Fairfield, CT (8 attendees) (May 10); gave the talk 'Invasive Pests of Connecticut Forests' to The Institute for Learning in Retirement, Inc. New Haven, CT (3 attendees) (May 25); and participated in the spring meeting of the Cooperative Agricultural Pest Survey (CAPS), New Haven CT (May 31).

DR. VICTORIA L. SMITH was interviewed by Frank Barnett of WNPR radio about beekeeping and bears (May 10); was interviewed by Zack Atanasoff of WFUV radio about issues facing pollinators (May 12); participated in a webinar training on using the Digital Sketch Mapping System, sponsored by the US Forest Service; about 30 participants nationwide (May 25); and participated in the spring meeting of the Cooperative Agricultural Pest Survey (CAPS) Committee, held in Jones Auditorium (12 participants) (May 31).

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO met with Prof. Francisco Zaera, University of California, Riverside to discuss mutual research interests (May 11); and attended the business meeting and awards ceremony of the Connecticut Academy of Science and Engineering, New Haven University (May 24).

DR. PHILIP ARMSTRONG gave a talk "Molecular Evolution of EEE virus in Connecticut" at the 7th Annual Northeastern EEE virus Conference held at CAES (May 6) (50 attendees); gave a talk " Mosquito and Arbovirus Surveillance in Connecticut" at the Symposium on Vector-Borne Diseases in Connecticut held at CAES (May 20) (100 attendees); was interviewed by CBS Evening News about the risk of Zika virus transmission in the US (May 2); and was interviewed by WTIC news and Fox News 61 about the statewide mosquito monitoring program (May 31).

DR. DOUGLAS BRACKNEY presented a poster "Genetic bottlenecks, RNA interference and selective constraints collectively influence Powassan virus evolution" at the Keystone Symposia: Positive Strand RNA Viruses, in Austin, TX (May 1- 5).

MR. GREGORY BUGBEE was interviewed by Zoe Roos of the Guilford Courier on control of invasive plants in lake Quonnipaug (May 23); and was interviewed by Will Rowland of The Connecticut Gardener on endophytes in tall fescue (May 24).

DR. GOUDARZ MOLAEI presented an invited talk, "*Avian Hosts as Superspreaders of Eastern Equine Encephalitis Virus*", to the 7th Northeastern EEE Virus Conference (May 6) (approx. 40 attendees); and presented a talk entitled, "*Tick-associated Diseases in Connecticut: A Major Public Health Challenge*", at the Connecticut Vector-borne Disease Symposium (May 20) (approx. 50 attendees).

MR. JOHN SHEPARD was interviewed about Connecticut mosquitoes and Zika virus by Scott McDonnell of WTNH-TV (May 6).

MR. MICHAEL THOMAS met with Laura Saucier of the Department of Energy and Environmental Protection to discuss management plans for the State endangered Tiger Spiketail, *Cordulegaster erronea*, at Devil's Hopyard State Park in East Haddam (May 3); and gave a talk on "Insect Macro Photog-

raphy" to the Connecticut Entomological Society at Sessions Woods, Burlington (May 21) (12 attendees).

FORESTRY AND HORTICULTURE

DR. JEFFREY WARD spoke on "Tree care: a homeowner's guide" to Evening Committee of the Branford Garden Club (15 attendees) (May 4); and spoke on forest management and invasive species control at a SCCRWA sponsored tour of Lake Gaillard (4 attendees) (May 12).

DR. ABIGAIL MAYNARD prepared and planted the Learning Garden and discussed gardening techniques at Hamden Hall Country Day School (26 students, 6 teachers) (May 2,10,17,24); reported Station activities at a quarterly meeting of the Council on Soil and Water Conservation in Windsor (18 adults) (May 5); and along with **DR. BLAIRE STEVEN**, met with Stephen Wood and Emily Oldfield of the Yale School of Forestry and Environmental Studies at the sheet composting plot at Lockwood Farm where they took soil samples (May 20).

DR. SCOTT WILLIAMS hosted a field visit for consulting botanist Bill Moorhead regarding invasive plant control and regeneration, Redding, CT (May 3); participated in a conference call for the Executive Board of the Connecticut Urban Forest Council (May 5); gave a brief talk to visiting FFA students about research activities at The Connecticut Agricultural Experiment Station (18 students, 1 teacher) (May 5); with **DR. KIRBY STAFFORD** and **MS. MEGAN LINSKE**, attended the Integrated Tick Management Symposium: Solving America's Tick-Borne Disease Problem, Washington, DC (May 16-17); interviewed by Nala Rogers for The Wildlife Professional about the recent release of the Northeast Section of the Wildlife Society's position statement on management of chronically overabundant deer (May 18); hosted the St. Thomas's Day School 1st grade class on a tour of CAES which included presentations by **DR. WADE ELMER, DR. CLAIRE RUTLEDGE, MS. KATHERINE DUGAS, MR. MARK CREIGHTON, and MS. JENNIFER FANZUTTI** (19 students, 4 teachers) (May 18); gave invited lecture titled "New Realities in Suburban Deer Management" at the 2016 Business Meeting and Conference of the International Hunter Education Association in Vergennes, VT (150 attendees) (May 25); and with **MR. MICHAEL SHORT** and **MS. MEGAN LINSKE**, conducted a botanical inventory for the Guilford Land Conservation Trust, Guilford, CT (May 27).

MR. JOSPH P. BARSKY co-organized the 2016 State FFA Agriscience Fair and led walking tours of CAES Departments (35 students, 5 teachers) (May 5); represented CAES at the 2016 Connecticut Agricultural Education Summit at Suffield High School (May 11); spoke to high school students about careers in forestry and natural resources at North Branford High School (May 20); and led a tree identification walking tour and along with **DR. ROBERT MARRA, MS. KATHERINE DUGAS**, and **MS. LINDSAY PATRICK**, staffed the CAES booth at the Connecticut Tree Festival, Cranbury Park, Norwalk (May 21).

PLANT PATHOLOGY AND ECOLOGY

DR. WADE ELMER accepted an Award of Appreciation on behalf of the Station from the Garden Club of New Haven, in Jones Auditorium (80 attended) (May 1); participated in the Compliance review of the Sound School in New Haven (17 attended) (May 3); and presented a talk on Salt Marsh Dieback to St. Thomas first grade class (18 children, 4 adults (May 18).

DR. FRANCIS FERRANDINO was interviewed by Chrislyn A. Particka, PhD Extension Support Specialist Cornell University for a personal profile article in the Northern Grapes News (May 26). http://northerngrapesproject.org/wp-content/uploads/2016/05/NG-News-Vol5-I2-May-2016.pdf

DR. YONGHAO LI organized a workshop and gave a talk titled 'Disease Diagnostics – How to identify Common Plant Health Problems' for the Experiment Station Association in New Haven (17 attendees) (May 19).

DR. ROBERT MARRA participated in an executive committee conference call for the Northeast Division of the American Phytopathological Society to discuss the October annual meeting in Ithaca, NY (May 4, 2016); served as special-award judges for the Greater New Haven Science Fair, (May 16 to 18, 2016) (see photo); participated in the Connecticut Tree Festival in Cranbury Park, Norwalk and demonstrated sonic and electrical-resistance tomography on a white oak in the park (40 attendees) (May 21); visited the Hotchkiss School, in Salisbury, CT, to analyze elm trees using sonic and electrical-resistance tomography (May 23); and hosted Dr. Ruth Yanai (SUNY-ESF) to discuss research collaborations on forest nutrient cycles (May 27).

MS. LINDSAY PATRICK served as a judge for the FFA AgriScience Fair (May 5) and the New Haven Science Fair (May 16-17) both in New Haven; assisted DR. YONGHAO LI with the Experimental Station Association (ESA) workshop on "Disease Diagnostics: How to Identify Common Plant Health Problems" in New Haven (17 attendees) (May 19); and staffed a CAES/Plant Disease information table at the Connecticut Tree Festival in Norwalk (May 21).

DR. TEJA SHIDORE served as special-award judges for the Greater New Haven Science Fair, on behalf of the CAES Special Award (May 16-18).

MR. PETER THIEL was visited by the 5th grade class from St. Thomas Day School and spoke about Sudden Vegetative Dieback at Hammonasset State Park, and the role of purple marsh crabs (*Sesarma reticulatum*) (3 adults, 19 children) (April 28).

Dr. Robert Marra presenting the CAES Special Award at the Greater New Haven Science Fair for the best project related to food, plants, insects, or the environment to Elena Brenna, an 8th grade student at Celentano School, for a project titled "Is Nanosilver Toxic to Freshwater Organisms?"

VALLEY LABORATORY

DR. RICHARD COWLES was a special guest speaker for the northeast small fruit growers' call-in discussion, discussing "Spotted wing drosophila and cyclamen mites, May 10 (20 attendees); and presented "Neonics, ornamental crops, and bees" to a twilight meeting of the Rhode Island Nursery Growers' Association, South Kingston, RI, (80 attendees)(May18).

MS. ROSE HISKES gave a talk on "Invasive Plants" to the Vernon Garden Club in Vernon (44 attendees)(May 16).

DR. JAMES LAMONDIA participated in a Potato Cyst Nematode Research Conference call to update research progress (May 10).

DR. DEWEI LI attended The 2016 Annual Northeastern Regional Conference on Occupational Health Surveillance will be held on May 16th and 17th, 2016 at The Guest House Conference Center, 318 West Main Street, Chester, Connecticut.

On behalf of the station, Dr. DeWei Li invited Dr. James Scott, Associate Professor, University of Toronto to give a Lockwood Lecture entitled 'Whiskey Fungus" on May 19. DeWei also invited Paula Schenck, Director of Indoor Environments and Health Programs, UConn Health, Division of Occupational and Environmental Medicine to give a seminar titled "mold" on May 25, 2016.

DEPARTMENTAL RESEARCH UPDATES MAY 2016

Servin, A.D.; De La Torre-Roche, R.; Castillo, H.; Pagano, L.; Hawthorne, J.; Musante, C.; **Pignatello, J.**; Uchimiya, M.; **White, J.C.** 2016. Exposure of agricultural crops to nanoparticle CeO2 in biochar amended soil. *Plant Phys. Biochem*. doi:10.1016/j.plaphy.2016.06.003.

Abstract- Biochar is seeing increased usage as an amendment in agricultural soils but the significance of nanoscale interactions between this additive and engineered nanoparticles (ENP) remains unknown. Corn, lettuce, soybean and zucchini were grown for 28 d in two different soils (agricultural, residential) amended with 0-2000 mg engineered nanoparticle (ENP) CeO2 kg-1 and biochar (350 °C or 600 °C) at application rates of 0-5% (w/w). At harvest, plants were analyzed for biomass, Ce content, chlorophyll and lipid peroxidation. Biomass from the four species grown in residential soil varied with species and biochar type. However, biomass in the agricultural soil amended with biochar 600 ºC was largely unaffected. Biochar co-exposure had minimal impact on Ce accumulation, with reduced or increased Ce content occurring at the highest (5%) biochar level. Soil-specific and biochar-specific effects on Ce accumulation were observed in the four species. For example, zucchini grown in agricultural soil with 2000 mg CeO2 kg-1 and 350 °C biochar (0.5-5%) accumulated greater Ce than the control. However, for the 600 °C biochar, the opposite effect was evident, with decreased Ce content as biochar increased. A principal component analysis showed that biochar type accounted for 56 -99% of the variance in chlorophyll and lipid peroxidation across the plants. SEM and μ-XRF showed Ce association with specific biochar and soil components, while μ-XANES analysis confirmed that after 28 d in soil, the Ce remained largely as CeO2. The current study demonstrates that biochar synthesis conditions significantly impact interactions with ENP, with subsequent effects on particle fate and effects.

Wang, Z.; Xu, L.; Wang, X.; **White, J.C.;** Xing, B. 2016. CuO nanoparticle interaction with Arabidopsis thaliana: Toxicity, parent-progeny transfer, and gene expression. *Environ. Sci. Technol*. doi:10.1021/acs.est.6b01017.

Abstract- We investigated the toxicity of CuO nanoparticles (NPs) to different Arabidopsis thaliana ecotypes (Col-0, Bay-0, and Ws-2) and monitored related parent-progeny transfer and changes in gene expression. CuO NPs (20, 50 mg L-1) inhibited seedling growth, as well as the germination of pollen and of harvested seeds. Col-0 was the more sensitive ecotype to CuO NPs as compared to Bay-0 and Ws-2. Equivalent Cu2+ ions (0.15 mg L-1) and CuO bulk particles (50 mg L-1) had no effect on the growth of Arabidopsis. After CuO NPs exposure, Cu was detected in the roots, leaves, flowers and harvested seeds of Arabidopsis. Based on X-ray absorption near-edge spectroscopy analysis (XANES), Cu in the harvested seeds was confirmed as being mainly in the form of CuO (88.8%). Moreover, CuO NPs-treated Arabidopsis exhibited unique patterns of gene expression as described by differential display reverse transcription polymerase chain reaction (DDRT-PCR). The differently expressed genes (C-1 and C-3) regulated root growth of Arabidopsis and reactive oxygen species (ROS) generation, respectively, which correlated well with the physiological root inhibition and oxidative stress data. The current study provides direct

evidence for the negative effects of CuO NPs on Arabidopsis, including accumulation and parent-progeny transfer of the particles, which may have significant implications with regard to the risk of NPs to food safety and security.

Malapi-Wright, M., J. E. Demers, D. Veltri, **R. E. Marra**, J A. Crouch. 2016 LAMP Detection Assays for Boxwood Blight Pathogens: A Comparative Genomics Approach. 2016. Scientific Reports, doi:10.1038/srep26140.

Abstract- Rapid and accurate molecular diagnostic tools are critical to efforts to minimize the impact and spread of emergent pathogens. The identification of diagnostic markers for novel pathogens presents several challenges, especially in the absence of information about population diversity and where genetic resources are limited. The objective of this study was to use comparative genomics datasets to find unique target regions suitable for the diagnosis of two fungal species causing a newly emergent blight disease of boxwood. Candidate marker regions for loop-mediated isothermal amplification (LAMP) assays were identified from draft genomes of *Calonectria henricotiae* and *C. pseudonaviculata*, as well as three related species not associated with this disease. To increase the probability of identifying unique targets, we used three approaches to mine genome datasets, based on (i) unique regions, (ii) polymorphisms, and (iii) presence/absence of regions across datasets. From a pool of candidate markers, we demonstrate LAMP assay specificity by testing related fungal species, common boxwood pathogens, and environmental samples containing 445 diverse fungal taxa. This comparative-genomics-based approach to the development of LAMP diagnostic assays is the first of its kind for fungi and could be easily applied to diagnostic marker development for other newly emergent plant pathogens

Xiao, F. and **Pignatello**, **J. J.** , Enhancement of organic compound adsorption to biochar by post-pyrolysis air oxidation, *Environmental Science and Technology*, online May 6, 2016, DOI: 10.1021/acs.est.6b00362.

Abstract- Biochar has attracted interest as an adsorbent in agriculture and environmental remediation. We describe here a method for enhancing adsorption of (ionizable) organic compounds to biochar at near neutral pH by subjecting it to brief post-pyrolysis air oxidation (PPAO) at 400 °C. The test set included seven weak acids and bases (pK_a, 3−5.2) and five neutral compounds selected from among the triazine and phenoxyacetic acid herbicide classes and industrial chemicals. The PPAO treatment enhanced the biochar mass-normalized adsorption of all tested compounds, especially the weak acids and bases, by up to 100-fold. A general and a specific effect of PPAO treatment were identified. The general effect results from the 'reaming' of pores by pore wall etching and possibly by combustion of tarry materials deposited during pyrolysis. Reaming generates new surface area and nanoporosity which helps relieve steric hindrance to adsorption. The specific effect operates for the weak acids and bases and results from the creation of new carboxyl functionality that provides sites for the formation of very strong charge-assisted hydrogen bonds (CAHB).

The formation of CAHB was verified by adsorptive competition experiments. Adsorption normalized by micropore surface area was constant for the neutral compounds, but still increased for the weak acids/bases in relation to PPAO time and carboxyl content. The proposed PPAO approach may be a way to conveniently increase the adsorptive properties of biochar, especially towards ionizable compounds. The results of this study may also provide insight into the effects of thermal air oxidation on char formation in general.

Ding Xiao-Lei, Ye Jian-Ren, Lin Si-Xi, Wu Xiao-Qin, **Li De-Wei**, Bo Nian. 2016. Deciphering the molecular variations of pine wood nematode Bursaphelenchus xylophilus with different virulence. PLoS ONE 11(5): e0156040. http://dx.doi.org/10.1371/journal.pone.0156040

Abstract-*Bursaphelenchus xylophilus* is the causative agent of pine wilt disease which has caused huge economic losses in many countries. It has been reported that two forms of pine wood nematodes existed in its native region, i.e., with strong virulence and weak virulence. However, little is known about the molecular differences between the two forms. To better understand their molecular variations, transcriptome and genome sequences of three strongly virulent and one weakly virulent strains were analyzed. We found 238 transcripts and 84 exons which showed notable changes between the two virulent forms. Functional analyses of both differentially expressed transcripts and exons indicated that different virulence strains showed dissimilar nematode growth, reproduction, and oxidoreductase activities. In addition, we also detected a small number of exon-skipping events in *B. xylophilus*. Meanwhile, 117 SNPs were identified as potential genetic markers in distinguishing the two forms. Four of them were further proved to have undergone allele specific expressions and possibly interrupted the target site of evolutionary conserved *B. xylophilus* miR-47. These particular SNPs were experimentally verified by including eight additional strains to ensure the validity of our sequencing results. These results could help researchers to better diagnose nematode species with different virulence and facilitate the control of pine wilt disease.

JOURNAL ARTICLES APPROVED MAY 2016

Cahill, M. E., Y. Yao, D. Nock, **P. M. Armstrong, T. G. Andreadis,** M. A. Diuk-Wasser, and R. R. Montgomery. Immune responses define susceptibility to infection with West Nile virus in Connecticut. *PLOS Neglected Tropical Diseases*

Cowles, Richard S. A synopsis of the neonicotinoid vs. bee controversy. *Perennial Plants* (online journal of The Perennial Plant Association)

Graney, L., **W. H. Elmer,** and A. L. Loyd. First report of Fusarium wilt of yellowwood (*Cladrastis kentukea*) caused by *Fusarium oxysporum*. *Plant Disease*

Guo, H., B. Xing, J. C. White, **A. Mukherjee**, and L. He. Ultra-sensitive determination of silver nanoparticles by surface-enhanced Raman spectroscopy after hydrophobization-mediated extraction. *Chemical Communications*

Kelly, Amy, R. H. Proctor, F. Belzile, S. N. Chulze, R. M. Clear, C. Cowger, **Wade H. Elmer**, T. Lee, F. Obanor, C. Waalwijk, and T. J. Ward. The geographic distribution and complex evolutionary history of the NX-2 trichothecene chemotype from *Fusarium graminearum*. *Fungal Genetics and Biology*

Maynard, A. A. Specialty eggplant trials 2010-2012. *CAES Bulletin*

Maynard, A. A. Specialty pumpkin trials 2009-2011. *CAES Bulletin*

Nguyen, J. N., J. R. Schein, K. A. Hunt, J. A. Tippmann-Feightner, M. Rapp, A. J. Stoffer, V. Nalam, **Neil P. Schultes**, and G. S. Mourad. Functional characterization of the sole nucleobase cation symporter 1 of *Nicotiana sylvestris* reveals a broad solute specificity profile. *Physiologia Plantarum*

Russo, N. J., Carole A. S-J. Cheah, and M. W. Tingley. Experimental evidence for branch-to-bird transfer as a mechanism for avian dispersal of the hemlock woolly adelgid. *Environmental Entomology*

Zhang, Z., H. Guo, T. Carlisle, **A. Mukherjee**, A. Kinchla, **Jason C. White**, B. Xing, and L. He. Evaluation of postharvest washing on Ag NPs removal from spinach leaves. *Journal of Agricultural and Food Chemistry*

GRANTS RECEIVED

Aulakh, J. S. received a grant ($500) from the Connecticut Christmas Tree Growers Association for weed control research.

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The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

You are cordially invited to attend the

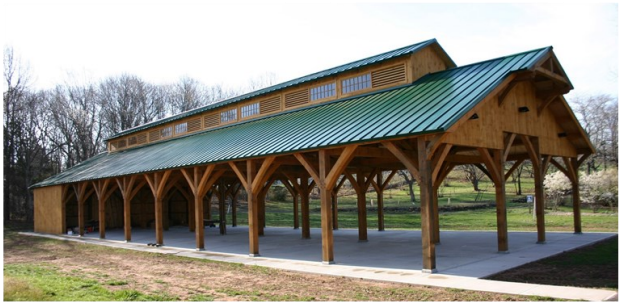
RIBBON-CUTTING CEREMONY

For

The Pavilion at Lockwood Farm

Thursday, May 19, 2016, 6:00 p.m.

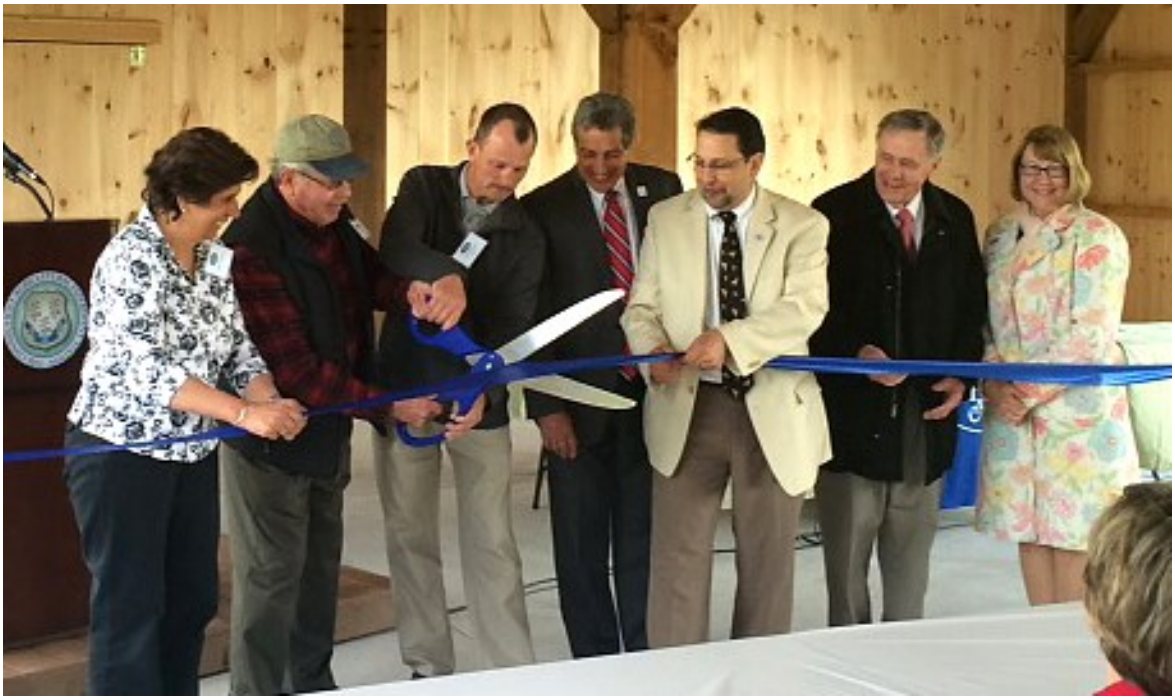
Lockwood Farm
The Connecticut Agricultural Experiment Station
890 Evergreen Avenue, Hamden, CT 06518



Held in conjunction with the Connecticut Forest and Parks Association Annual Meeting to Follow the Ribbon Cutting Ceremony.

RSVP by Monday, May 16, 2016
Sandra Carney 203-974-8497, Sandra.E.Carney@ct.gov

The pavilion at Lockwood Farm was commissioned by the Experiment Station's Board of Control with funds provided by the Lockwood Trust. It was designed and constructed by Steven Strong of East Hampton, CT, a 5th generation sawyer. The Pavilion is built with eastern white pine, grown and harvested from Babcock pond state forest in Westchester, CT. The white oak pegs and splines were grown at Steven Strong's 50 acre farm in East Hampton. The pavilion design features a large cupola to allow natural light and ventilation as well as adding more open feel in the interior of the building. The pavilion is constructed using traditional timber framing post and beam techniques with large heart sawn timbers. The boards from the edges of the timbers were used to construct the window and louver units in the cupola .



Ms. Joan Nichols (Member, CAES Board of Control), Mr. Terry Jones (Vice President, CAES Board of Control), Mr. Steven Strong (Builder), Dr. Theodore Andreadis (CAES Director), Mr. Stephen Reviczky (Member, CAES Board of Control and Commissioner of Agriculture), Dr. John Anderson (CAES Former Director), Ms. Susan Whalen (Deputy Commissioner, Department of Energy and Environmental Protection).

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The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

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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

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