STATION NEWS

The Connecticut Agricultural Experiment Station

CAES

The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

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.

VOLUME 5, ISSUE 7

JULY 2015

Departmental News

DEPARTMENTAL NEWS

ADMINISTRATION

DR. THEODORE ANDREADIS attended a reception of the Northeast Association of State Departments of Agriculture held at the Governor's residence in Hartford (June 8); presented an overview of research, service and regulatory activities of the Experiment Station to delegates from the Northeast Association of State Departments of Agriculture (50 attendees) (June 9); hosted Governor Malloy, presented opening remarks and a tribute to Dr. Paul Waggoner during the ribbon cutting ceremony for the Jenkins-Waggoner Laboratory (150 attendees) (June 11); presented opening remarks and an overview of the Experiment Station to a community group hosted by the Yale School of Forestry (15 attendee) (June 16); was interviewed about current research programs and service related activities being conducted by scientific staff in the newly renovated Jenkins-Waggoner Laboratory by Aidan Quigley, Waterbury Republican (June 16); was interviewed about the expanded tick testing services provided by CAES by Bob Miller, News Times and Aiden Quigley Waterbury Republican (June 18); and presented an overview of research, service and regulatory activities of the Experiment Station to a group of students from Central Connecticut State University (25 attendees) (June 25).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE attended the monthly Laboratory Preparedness Advisory Committee meeting at the Department of Public Health Laboratory in Rocky Hill CT (June 1); hosted Lockwood Lecturer Dr. Melanie Kah of the University of Vienna (Austria)(June 3-4); along with **DR WALTER KROL** participated in a CT DEEP-led conference call of the Lobster Pesticide Study 2014 Steering Committee to discuss the upcoming method validation with the University of CT (June 4); attended the Nanoscale Science and Engineering for Agriculture and Food Systems Gordon Research Conference and gave a lecture entitled "Trophic transfer of engineered nanoparticles in agricultural systems" (120 attendees)(June 7-12); met with representatives from the Northeast Association of State Departments of Agriculture (NEASDA) and provided a tour of Department laboratories and description of key programs (30 attendees)(June 9); along with **DR. BRIAN EITZER, DR. CHRISTINA ROBB, DR. WALTER KROL, DR. SANGHAMITRA MAJUMDAR, DR. ARNAB MUKERJEE, MS. KITTY PRAPAYOTIN-RIVEROS, MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, MR. CRAIG MUSANTE, AND MS. TERRI ARSENAULT** participated in the FDA FERN cCAP monthly teleconference call (June 11); along with **DR. CHRISTINA ROBB, DR. WALTER KROL, MS. KITTY PRAPAYOTIN-RIVEROS, MR. MICHAEL CAVADINI, AND MS. TERRI ARSENAULT** participated in the FDA ISO MFRPS quarter 3 teleconference call (June 11); attended a day-long CHRO training session at the Legislative Office Building in Harford on new regulations for affirmative action plan construction (June 18); held a conference call with representatives of the CT Department of Agriculture regarding an upcoming joint application to the FDA Animal Feed Regulatory Program Standards (AFRPS) Cooperative Agreement Program (June 22); and travelled to Kunming University of Science and Technology in Kunming China to give an invited lecture entitled "Interactions between engineered nanomaterials and agricultural crops" (55 attendees)(June 23-30).

Dr. BRIAN EITZER was an instructor for the class entitled "LB511 FDA/FERN Chemistry Training for LC/MS" which was held at the Food and Drug Administration's Forensic Chemistry Center in Cincinnati, OH from June 21-26 (13 students); and was a participant in the North American Chemical Residue Workshops organizing committee's conference call (June 18).

DR CHRISTINA ROBB gave a tour of the department to the Central Connecticut State University students (June 25).

ENTOMOLOGY

DR. CLAIRE E. RUTLEDGE served as examiner for the state arborist licensing exam held at the Station (June 10); and attended the semi-annual Cooperative Agricultural Pest Survey (CAPS) meeting in Jones Auditorium (June 16).

DR. VICTORIA L. SMITH was interviewed about gypsy moth, winter moth, and ticks by Judy Benson of the New London Day (June 23).

DR. KIMBERLY A. STONER was interviewed about bees and pollination by Sean Sullivan, a freelance writer (June 3); gave a talk titled "Keeping the Bees" to a meeting of the Northeastern Association of State Departments of Agriculture at the Study at Yale (40 adult attendees) and gave them a tour of the Bee Laboratory at CAES and followed up with answers to questions from the talk (June 9); was interviewed about bees and pollination research by Anders Helm for a story in Moo Dog Press (June 11); and was interviewed about native bee diversity in Connecticut by Greg Hladky of the Hartford Courant (June 26).

DR. KIRBY C. STAFFORD III attended the symposium and dinner in honor of the retirement of Dr. Durland Fish at Yale University (June 1); was interviewed about the relapsing fever bacterium *Borrelia miyamotoi* by Erin Logan, WTNH Channel 8 News (June 9); was interviewed about tick control research and support of tick research by Amy Masters, WCVB Channel 5 Boston (June 11); was interviewed about tick control and education by Sam Evans-Brown, New Hampshire Public Radio (June 17); was interviewed about tick control studies by Keith Kountz, WTNH Channel 8 News, on behalf of Amy Masters, WCVB Channel 5 Boston (June 17); was interviewed about tick control studies by Melinda Wenner Moyer, a science and health writer for Nature magazine (June 18); was interviewed about tick control research by Aidan Quigley, Waterbury Republican-American (June 23); was interviewed about tick activity and tick testing by Judy Benson, The Day-New London (June 23); was interviewed about tick-bite prevention by Sophie Ota, Redding Pilot (June 25); and was interviewed about the gypsy moth by Cynthia Drummond, Westerly Sun (June 25).

MR. MARK H. CREIGHTON spoke on bees and pollination and displayed an observation hive for students at the YMCA pre-school in Middletown (45 youth attendees) (June 11).

DR. DOUGLAS W. DINGMAN, with **DR. NEIL P. SCHULTES**, presented a "lunch and learn" seminar titled "Know GMO" to staff at GE Financial Services in Stamford (50 attendees) (June 11).

MS. KATHERINE D. DUGAS organized and ran the Statewide Cooperative Agricultural Pest Survey (CAPS) Committee meeting held in Jones Auditorium (11 attendees) (June 16).

DR. CHRIS T. MAIER spoke about the brown marmorated stink bug at a meeting of the Advisory Committee of the Cooperative Agricultural Pest Survey held in Jones Auditorium (June 16); spoke about alternate hosts of the brown marmorated stink bug and the spotted wing drosophila at a twilight meeting of the Connecticut Pomological Society at Norton Brothers Orchard in Cheshire (June 23).

DR. GALE E. RIDGE was visited by first-grade students from St. Thomas Day School and discussed the roll of the Insect Information Office (May 6); gave a talk about numerous protective behaviors and speciation of the Common bed bug *Cimex lectularius* L. at the Public Health Research and Services Symposium, which was sponsored by CAES under the leadership of Dr. Goudarz Molaei (May 6); was interviewed about gypsy moth, mosquitoes and chikungunya virus, and emerald ash borer by Harlan Levi, Hartford Courant (May 11); was interviewed and broadcast on WTNH TV Channel 8 about the current gypsy moth outbreak (June 18); was interviewed about gypsy moths by WATR, Waterbury (June 19); was interviewed about gypsy moths by the Waterbury Republican-American (June 22); was interviewed about gypsy moth defoliation and its effects on tree health by the Waterbury Republican-American (June 26); and the Shelton Herald published her comments on the “Gypsy moth outbreak in Connecticut” (June 26).

FORESTRY AND HORTICULTURE

DR. JEFFREY WARD spoke on roadside forest management at the Northeastern Area Association of State Foresters Utilization Committee annual meeting in Norfolk (15 attendees) (June 2); spoke of CAES forestry research at the Hudson to Housatonic landowner outreach in Greenwich (11 attendees) (June 3); spoke of CAES forestry research at the Hudson to Housatonic landowner outreach in Stamford (17 attendees) (June 4); spoke on tree identification and life histories on the Meriden Linear Trail for National Trails Day (8 children, 12 adults) (June 7); along with **DR. ADRIANA ARANGO**, administered practical and oral examination to arborist candidates for the Connecticut Tree Protection Examining Board (June 10); spoke on managing trees and forests to increase utility resiliency to storm damage at the Connecticut Chapter - American Society of Landscape Architects' Trees and Design program in Waterbury (105 attendees) (June 16); was interviewed by running bamboo by Sujata Jain of WFSB-3, Hartford (June 17); spoke on forestry and horticultural research to students from Central Connecticut State University (12 attendees) (June 25); was interviewed by barberry, ticks, and Lyme disease by Erin Connolly of WFSB-3, Hartford (June 25); and attended an executive committee meeting of the Connecticut Urban Forest Council in New Haven (June 26).

DR. ADRIANA ARANGO VELEZ along with **DR. LINDSAY TRIPLETT**, spoke on photosynthesis and stomata function for visiting 6th grade botany students from Celentano Biotech, Health and Medical Magnet School, New Haven (20 students, 1 teacher) (June 12); interviewed by John Burgeson from the Connecticut Post about extent of Southern Pine Beetle infestation in Connecticut (June 10); and interviewed by Samuel Kantrow from WTNH/WCTX about impact of the Southern Pine Beetle infestation in Connecticut (June 19).

DR. JEFFREY WARD discussed the New Crops Program and toured Rose Farm in Glastonbury (June 19).

DR. SCOTT WILLIAMS interviewed by Melinda Wenner Moyer of Nature Magazine on small mammal trapping and residential blacklegged tick management in Redding (June 30); working collaboratively with Dr. Anthony DeNicola of White Buffalo, Inc., met with Paul Lenz, Deputy Chief of New York City Environmental Protection and staff about deer management on NYC watershed lands (3 staff) (June 5); and gave invited lecture titled "Ticked Off!-Invasive Plants and Lyme Disease, a Surprising Connection" at the Annual Meeting of the North Branford Land Conservation Trust, Northford (45 attendees) (June 3).

MR. JOSEPH P. BARSKY participated in the New England Society of American Foresters Executive Committee Meeting in Portland, ME (June 17).

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO presented a poster "Nanoscale Interactions between Engineered Nanomaterials and Black Carbon (Biochar) in Soil" and co-authored a second poster at the Gordon Research Conference on Nanoscale Science & Engineering for Agriculture & Food Systems, Bentley University, Waltham, MA (135 participants) (June 7-12); gave a talk "Photocatalysis By Polyoxometalates In Water Treatment: A Detailed Study Of Catalyst Regeneration And Reactive Oxygen Species Formation From Bulk Oxidants" (approximately 100 attendees); and co-authored a second talk and two posters at the conference of the Association of Environmental Engineering Scientists and Professors, Yale University (June 13-16, approximately 600 registrants).
DR. PHILIP ARMSTRONG gave the talk "Surveillance for Mosquito Borne Viruses" at the State Laboratory Preparedness Advisory Committee Meeting in Rocky Hill (30 attendees) (June 1,); was interviewed by Mark Simms of CT Radio Network about mosquito-borne diseases in Connecticut (June 1 and June 4); was interviewed by WTNH Channel 8 about the mosquito surveillance program (June 2); and was interviewed by Fox CT News about the relationship between weather and mosquito populations (June 15).

MR. GREGORY BUGBEE gave a talk "Container Gardening Indoors and Out" at the Cragin Memorial Library in Colchester. (approx. 25 attendees) (June 1); was interviewed by Katlin Koerting on the Danbury News Times on invasive aquatic plants in Squantz Pond (June 9) and Water Chestnut in Lake Lillinonah (June 11); spoke on "Soil Testing" to the Urban Resource Initiative (URI) here at the Station. (approx. 12 attendees) (June 16); and spoke on "Soil Testing and Invasive Aquatic Plants" to a group from Central Connecticut State University (approx. 20 attendees) (June 25).

DR. GOUDARZ MOLAEI hosted a summer season citizens group of the Hixon Center for Urban Ecology, Urban Resources Initiative (URI), Yale School of Forestry & Environmental Studies at the CAES Tick Testing Laboratory, and presented a short talk on tick-associated diseases and services offered at this laboratory (20 attendees)(June 16); was interviewed by WNPR about the CAES Tick Testing Program (June 23); hosted a group of students from the Central Connecticut State University at the Molecular Vector Biology Laboratory/Tick Testing Laboratory, and presented a short talk on mosquito and tick research projects, as well as services offered by the CAES Tick Testing Laboratory (17 attendees) (June 25); and was interviewed by the newspaper Republican American, Waterbury, about the CAES Tick Testing Program and research projects (June 28,).

MR. JOHN SHEPARD spoke to a group of students from Central Connecticut State University about the state Mosquito Surveillance Program, West Nile virus and Eastern Equine Encephalitis (20 attendees) (June 25).

MR. MICHAEL THOMAS participated in a Biodiversity Camp (Northwest Park, Windsor) held for children in grades 6 to 8 from the Environmental Sciences Magnet School (ESM) at Mary Hooker, Two Rivers Magnet Middle School in East Hartford, and other Greater Hartford middle schools (28 attendees) (June 25).

DR. BLAIRE STEVEN presented the talk "A Microbial Ecological View of Sudden Vegetation Dieback in a Connecticut Wetland" at the Society of Wetland Scientists Meeting in Providence, RI (approximately 30 attendees) (June 1-4).

PLANT PATHOLOGY AND ECOLOGY

DR. SANDRA L. ANAGNOSTAKIS took 100 timber chestnut trees from the CAES breeding program to MDC water company land near the Nepaug State Forest for planting. Carol Youell was in charge and brought five helpers who made quick work of the project (June 3).

DR. SHARON M. DOUGLAS was interviewed about poison ivy and why it seems to be more plentiful this year than in the past by Bob Miller of the Danbury News Times (June 8); and participated in the Cooperative Agricultural Pest Survey (CAPS) meeting to discuss current surveys and plans for 2016 in Jones Auditorium (12 adult attendees) (June 16).

DR. WADE H. ELMER spoke about salt marsh dieback to fourth graders at the Cold Spring School in New Haven. He also participated in creating the fourth-grade Pod cast (3 student attendees) (June 16); attended the Connecticut Greenhouse Growers Association/UConn/CAES workshop on hydroponics in Jones Auditorium (June 23); and was interviewed about "Stakeholder perceptions of student success in place-based schools**"** by Josef Graham, a doctoral student at Western Connecticut State University, for his Ph.D. program (June 24).

DR. FRANCIS J. FERRANDINO gave a talk titled "The role of CAES in support of the farm wine industry since 1970" at the Connecticut Farm Wine Council meeting in Hartford (20 adult attendees) (June 18).

MS. REGAN B. HUNTLEY, with **DR. QUAN ZENG**, attended the twilight meeting of the Connecticut Pomological Society and spoke with tree fruit growers and pollinator providers and answered their questions about fire blight and other tree fruit diseases at Norton Brothers Orchard in Cheshire (60 attendees) (June 23).

DR. YONGHAO LI spoke about the role of the Plant Disease Information Office to a group from the Urban Resources Initiative of Yale University's School of Forestry & Environmental Studies who were touring the Station (20 attendees) (June 16); gave a talk titled "Needlecast disease management" at the twilight meeting of the CT Christmas Tree Growers Association in Guilford (35 attendees) (June 17); and attended the Proven Biological Control Program in Storrs (June 18).

DR. ROBERT E. MARRA spoke to a citizens group from the Urban Resources Initiative of Yale University's School of Forestry & Environmental Studies, who were visiting the Station to learn about the role of CAES, its services, and the grounds (June 16).

DR. NEIL P. SCHULTES, with **DR. DOUGLAS W. DINGMAN**, presented a "lunch and learn" seminar titled "Know GMO" to staff at GE Financial Services in Stamford (50 attendees) (June 11).

DR. LINDSAY R. TRIPLETT gave a Yale Green Café presentation titled "Carolina gold rush: rice comes to America" at the Marsh Botanical Garden greenhouse in New Haven (25 students, faculty, and community members attended) (June 4); with **DR. ADRIANA ARANGO-VELEZ**, hosted the 6th grade classes of Ms. Bell and Mr. Alvarez from Celentano Health and Biotech Middle School (38 students attended) (June 9 and 12). The students brought leaf samples they collected in Edgerton Park as part of their project "Is a tree an ecosystem?" The students asked questions in the plant disease and insect inquiry offices, made bacterial leaf prints on nutrient agar, and examined the stomata of their leaves under the microscope.

DR. QUAN ZENG, with **MS. REGAN HUNTLEY**, attended the twilight meeting of the Connecticut Pomological Society at Norton Brothers Orchard in Cheshire (60 attendees) (June 23). Dr. Zeng gave a presentation titled "Monitor and prevent streptomycin resistance in Connecticut," in which he updated the fire blight disease situation in 2015 in New England, and summarized recent findings in streptomycin resistance survey. He also spoke with tree fruit growers and pollinator providers and answered their questions about fire blight and other tree fruit diseases http://ipm.uconn.edu/documents/raw2/html/785.php?aid=785

VALLEY LABORATORY

DR. RICHARD COWLES presented "What's Happening to All the Bees" to the Cornell Club of Greater Hartford, Windsor, (15 attendees) (June 2); discussed "Phagostimulants to Improve Effectiveness of SWD Insecticides" in a webinar hosted by Marrone Biosciences (international attendance, unknown number of attendees) (June 10); spoke on the subject "Christmas tree pest management" at a twilight meeting of the CT Christmas Tree Growers' Association, Guilford, CT, (35 attendees) (June 17); and discussed "Entomological research," to teachers attending an SCSU summer training program in Windsor (12 attendees) (June 24).

DR. JAMES LAMONDIA spoke about the Valley Laboratory, Connecticut wrapper tobacco production and research and toured shade tobacco in Windsor to the Northeast Association of State Departments of Agriculture at the Valley Laboratory (40 people) (June 8); participated in farm tours and interviews by the Connecticut Agricultural Information Council to select the Connecticut Century Farm Award (June 15); met with Greg Hannig of Dupont at the Valley Lab to tour plots and discuss research (June 23); spoke about the Station, services and plant pathology research to Southern Connecticut State University 5th year certificate science teachers (June 24); and participated in a planning meeting for Arboriculture 101 in Northford, (June 29).

DR. DEWEI LI participated in a meeting of the advisory board and research team for "Recovery from Catastrophic Weather -Hurricane Sandy: Mold Exposure and Health-Related Training project" (June 12) at the UCONN Health Center, Center for Indoor Environments and Health in Farmington, CT. De-Wei is serving as an advisor for the project. During the meeting participants discussed the progress of the project and the final workshop. Twelve people participated the meeting.

DEPARTMENTAL RESEARCH UPDATES JUNE 2015

Triplett, Lindsay. 2015. Rhododendron tissue proliferation. CAES Fact Sheet.

ABSTRACT: This fact sheet contains pictures and descriptions helpful to distinguish rhododendron tissue proliferation from infectious diseases, and to understand current understanding of its possible causes. Tissue proliferation has re-emerged in Connecticut nurseries in recent years.

http://www.ct.gov/caes/lib/caes/documents/publications/fact_sheets/plant_pathology_and_ecology/rhododendron_tissue_proliferation_05-26-15.pdf

Han, Q., C. Zhou, S. Wu, Y. Liu, **Lindsay Triplett**, J. Miao, J. Tokuhisa, L. Deblais, H. Robinson, J. E. Leach, J. Li, and B. Zhao. 2015. Crystal structure of the complex between Xanthomonas AvrRxo1-ORF1, a type III effector with a polynucleotide kinase domain, and its interactor AvrRxo1-ORF2. Structure, accepted.

ABSTRACT: *Xanthomonas oryzae* pv. *oryzicola* (*Xoc*) causes bacterial leaf streak (BLS) disease on rice plants. *Xoc* delivers a type 3 effector AvrRxo1-ORF1 into rice plant cells that can be recognized by disease resistance (R) protein Rxo1 and triggers resistance to BLS disease. However, the mechanism and virulence role of AvrRxo1 is not known. In the genome of *Xoc*, *AvrRxo1-ORF1* is adjacent to another gene *AvrRxo1-ORF2* that was predicted to encode a molecular chaperone of AvrRxo1-ORF1. We report the co-purification and crystallization of the AvrRxo1-ORF1:AvrRxo1-ORF2 tetramer complex at 1.64 Å resolution. AvrRxo1-ORF1 has a T4 polynucleotide kinase domain, and expression of AvrRxo1-ORF1 suppresses bacterial growth in a manner dependent on the kinase motif. Although AvrRxo1-ORF2 binds AvrRxo1-ORF1, it is structurally different from typical effector-binding chaperones, in that it has a distinct fold containing a novel kinase-binding domain. AvrRxo1-ORF2 functions to suppress the bacteriostatic activity of AvrRxo1-ORF1 in bacterial cells.

Zeng, Quan and Ching-Hong Yang. 2015. Posttranscriptional and Posttranslational Regulatory Mechanisms for Virulence Factors, Chapter 12, in *Virulence Mechanisms of Plant-Pathogenic Bacteria*.

ABSTRACT: This book, which systemically reviews various pathogenicity factors, regulatory signaling, and new research technologies in the area of phytobacteriology, is recently published by the American Phytopathological Society (APS) Press. In Chapter 12, Dr. Quan Zeng and Dr. Ching-Hong Yang reviewed mechanisms and recent progress in how plant-pathogenic bacteria utilize posttranscriptional and posttranslational mechanisms, such as small regulatory RNA, glycosylation, protein degradation, to perceive environmental signals and modulate important virulence factors during infection. Highlight of this book could be found at: http://www.apsnet.org/apsstore/shopapspress/Pages/44440.aspx

He Qiang, Liu Shao-Lun, Ma Zheng-Gang, Zhang You-Yi, **Charles R. Vossbrinck**, Xu Jin-Shan,* Zhou Ze-Yang, Comparative genomics of three geographical strains reveals genetic diversity in *Antheraea pernyinucleopolyhedrovirus* (AnpeNPV), *Acta Entomologica Sinica* 58(5): 535-545 (2015).

ABSTRACT: Antheraea pernyi nucleopolyhedrovirus (AnpeNPV) produces epizootic outbreaks in populations of the oak silkworm *A. pernyi*. We conducted a comparative analysis among three AnpeNPV isolates to gain insight into the host/parasite interactions of this system at the molecular level. We sequenced the genome of an AnpeNPV (AnpeNPV-H) isolated from Henan province, China and performed a comparative analysis with two previously sequenced isolates (AnpeNPV-L and AnpeNPV-Z) from Liaoning province. The AnpeNPV-H strain is 125 605 bp in length and contains 146 open reading frames of which 95 are identified as functional proteins and 51 are annotated as hypothetical proteins. The genetic arrangement (synteny) of the three strains is identical while six ORFs are truncated by stop codons in one or two of the isolates. There are more than 200 single nucleotide variations (SNVs) among the three AnpeNPV strains, 85% of which are found in coding regions. Fifty genes show amino acid changes, three of which (*odv-e56, p94-like,* and *egt*) have higher evolutionary rates of change (*dN/dS*>1), suggesting positive or purifying selection. Significant amino acid differences (changes in charge or hydrophobicity among isolates) are seen in envelope proteins, DNA polymerase, helicase and proteins involved in apoptosis and ecdysis. Finally, we show evidence of genetic recombination between AnpeNPV strains. This study reveals the level of intra-species variation among the strains examined and lends insight into host/virus interactions based on the dynamics of the *A. pernyi* nuclear polyhedrosis virus (AnpeNPV) genome.

ARTICLES OF INTEREST JUNE 2015

NEASDA is the annual meeting of the Northeastern Association of State Departments of Agriculture (NEASDA). Those states include Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont. The President of NEASDA is Connecticut Commissioner of Agriculture Steven Reviczky. CAES hosted this group for an informational tour with Dr. Theodore Andreadis, Dr. Jason White, Dr. Kimberly Stoner, and Dr. Quan Zeng.

Wade Elmer with fourth-graders from the Cold Spring School in New Haven on the Fargeorge salt marsh preserve along the Quinnipiac River in East Haven.

Left: Professor Jorge Gardea-Torresdey of the University of Texas-El Paso.
Center: Dr. Yingjie Zhang; President of Kunming University of Science and Technology.

STATION NEWS

The Connecticut Agricultural Experiment Station

DR. SANDRA L. ANAGNOSTAKIS took 100 timber chestnut trees from the CAES breeding program to MDC water company land near the Nepaug State Forest for planting. Carol Youell was in charge and brought five helpers who made quick work of the project (June 3).

DR. SANDRA ANAGNOSTAKIS took thirty orchard chestnut trees from the CAES breeding program to the Rhoraback Wildlife Area in Torrington, where Peter Picone and two helpers planted them at the edges of open land to provide wildlife food (June 30).

Dead gypsy moth caterpillars on an oak defoliated by the *Entomophaga maimaiga* fungus.

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

STATION NEWS

The Connecticut Agricultural Experiment Station

JOURNAL ARTICLES APPROVED JUNE 2015

Arango-Velez, Adriana, Walid El Kayal, Charles C. J. Copeland, L. Irina Zaharia, Inka Lusebrink, and Janice E. K. Cooke. Differences in defense responses of *Pinus contorta* and *Pinus banksiana* to the mountain pine beetle fungal associated *Grosmannia clavigera* are affected by water deficit. *Plant Cell & Environment*

Elmer, Wade H. Using mineral nutrition to suppress plant diseases. *CAES Fact Sheet*

Li, De-Wei, Neil Schultes, and **Charles Vossbrinck.** First report of *Olpitrichum sphaerospora* Matsush. in the USA and its phylogenetic placement. *Mycological Progress*

Gámiz, Beatriz, **Joseph J. Pignatello,** Lucía Cox, María C. Hermosín, and Rafael Celis. Enantioselective behavior of the fungicide metalaxyl in an agricultural soil amended with composted olive-mill waste and its biochar. *Journal of Agricultural and Food Chemistry*

Ward, Jeffrey S., and **Scott C. Williams.** It's complicated: interaction of invasive shrubs and cervid herbivory on plant communities. *Ecological Monographs*

Zarrillo, Tracy, Kimberly A. Stoner, J. Ascher, and J. Gibbs. New and noteworthy records of bees (Hymenoptera: Apoidea: Anthophila) for Connecticut. *Journal of the Kansas Entomological Society*

Zeng, Quan, and Ching-Hong Yang. Posttranscriptional and posttranslational regulatory mechanisms for virulence factors. Chapter 12 in *Virulence Mechanisms of Plant-Pathogenic Bacteria,* APS Press, St. Paul, MN

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

STATION NEWS

The Connecticut Agricultural Experiment Station

GRANTS RECEIVED JUNE 2015

Rosa Raudales, **Wade Elmer,** and Leanne Pundt were awarded $75,000 ($10,000 to CAES) from the CT Department of Agriculture Specialty Crop Block Grant Program-FB for the proposal "Integrated Control of Root Pathogens in Hydroponic Solutions."

Joseph Pignatello, Biochar Amendment: A Sustainable Remediation Strategy for Shallow Soil Contamination by Heavy Hydrocarbons; Chevron Inc. and the University of California; (with a consortium of researchers from U. California, Davis and other universities) $15,000; 2-22-15 to 2-21-16.

The primary goal of this project is to evaluate novel low-tech, economical, sustainable and eco-friendly methods for reducing measurable total petroleum hydrocarbons (TPH) in shallow soils contaminated with heavy hydrocarbons (HH), stabilizing some components of HH contamination, and increasing biodegradation of other components of HH contamination. Chars are the first step in the production of activated carbon, and thus biochars (chars applied to soils) have many of the same characteristics (e.g., relatively high surface area and intraparticle pore volume) and serve as a sorbent for contaminants from water or vapor and a substratum for bacterial attachment. We propose to do this through amendment of HH-contaminated soils with biochar, both with and without biostimulants. In Year 1 (Y1) we found that incubations of HH contaminated soils with ponderosa pine and walnut shell biochars and either ethanol, soybean oil, or orange peel were effective in reducing TPH. In Year 2 (Y2), we will build on these promising results to tailor biochars and treatment conditions (in situ, ex situ) to maximize TPH reduction in soil and climatic conditions relevant to Chevron high priority areas. Based on our own research and a literature review, including very recent and encouraging papers, we propose that biochars applied to HH-contaminated soils can increase microbial activity and lower TPH significantly. We therefore hypothesize that:

1. TPH reduction may occur in part due to sorption of contaminants into the biochar, reducing their extraction by the TPH preparation method;

2. Some components of HH contamination are sequestered within the biochar internal porosity, making them less bioavailable in the bulk soil;

3. An increase in the biodegradation rate of other components of HH contamination may occur since microbes use the biochar as a physical substrate with potential regionalized reduction in toxicity (toxin sorption) and predation (physical protection);

4. Biochar will improve various aspects of soil fertility (e.g., water retention, cation exchange capacity, nutrient cycling) thus allowing improved revegetation after biochar amendment, development of a more bioactive root zone, and reduction in erosion;

5. Biochar will provide, if hypotheses 1-3 are true, benefits to other potential or established low-tech approaches for enhancing soil properties (tilling in of manure, compost,) or adding more labile substrates to stimulate HH degradation (e.g. citrus oil, vegetable oil,);

6. Energy generated in the biochar production process could be used in a sustainability context (e.g., provide heat).

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION

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

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

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

Putting Science to Work for Society.

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

WWW.CT.GOV/CAES

Entrance to The Connecticut Agricultural Experiment Station in New Haven on Huntington Street

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 http://www.ct.gov/caes/cwp/view.asp?a=2826&q=378188

The Connecticut Agricultural Experiment Station (CAES) prohibits discrimination in all of its programs and activities on the basis of race, color, ancestry, national origin, sex, religious creed, age, political beliefs, sexual orientation, criminal conviction record, gender identity, genetic information, learning disability, present or past history of mental disorder, mental retardation or physical disability including but not limited to blindness, or marital or family status. To file a complaint of discrimination, write Director, The Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven, CT 06504, or call (203) 974-8440. 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 at (203) 974-8442 (voice); (203) 974-8502 (FAX); or Michael.Last@ct.gov (E-mail).

Station News was prepared and edited by Dr. Theodore G. Andreadis, Mrs. Vickie Bomba-Lewandoski, and Ms. Rebecca Carlone.