

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.



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DEPARTMENTAL NEWS

ADMINISTRATION

DR. THEODORE ANDREADIS presented a talk entitled, *Eastern equine encephalitis virus: reemergence and expansion in the northeastern United States* at the 81st Annual Meeting of the American Mosquito Control Association (900 attendees) (April 1); was interviewed about Powassan virus in Connecticut by Fran Schneidau, WCBS Radio New York (April 7); presided over a quarterly meeting of the Experiment Station's Board of Control (April 8); presented an *Update on Activities at the Connecticut Agricultural Experiment Station* at the Annual Meeting of the Experiment Station Associates (30 attendees, April 8); presented a lecture, *Global climate change and mosquito-borne diseases* to a class of students at the Yale School of Public Health (12 attendees) (April 22); and welcomed and gave opening remarks at a ceremony honoring 5th grade student winners of the CTPA Arbor Day Poster Contest with a tree planting at the CT Agricultural Experiment Station (75 attendees) (April 24).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE participated in a teleconference call with colleagues at Kansas State University to initiate planning for the upcoming 12th International Phytotechnologies Conference to be held in Manhattan KS this coming September (April 2); attended the monthly Laboratory Preparedness Advisory Committee meeting at the Department of Public Health Laboratory in Rocky Hill CT (April 6); met with Dr. Jatinder Aulakh and described Department programs and areas of mutual interest; Dr. Aulakh was interviewing for the Weed Scientist position at the Valley Lab (April 8); hosted Professor Stephen Ebbs of Southern Illinois University and discussed current and future collaborative research projects (April 9); along with **DR. BRIAN EITZER, DR. CHRISTINA ROBB, DR. WALTER KROL, MS. KITTY PRAPAYOTIN-RIVEROS, DR., MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, MR. CRAIG MUSANTE, AND MS. TERRI ARSENAULT** participated in the FDA FERN cCAP monthly teleconference call (April 9); along with visiting Post-Doctoral Fellow Dr. Luca Pagano held a Skype video conference call with colleagues at the University of Parma regarding ongoing collaborative research (April 10); gave an invited lecture at the CT Department of Public Health Laboratory entitled "Nanotechnology: Applications, Implications, and Risk...Oh my" (60 attendees) (April 28); and along with **DR. BRIAN EITZER** participated in a FDA FERN teleconference call on the recently released request for applications for the funding the next 5-years of the chemistry Cooperative Agreement Program (cCAP) (April 30).

DR. BRIAN EITZER participated in conference calls related to the development of a class in liquid chromatography/mass spectrometry that will be taught for the FDA as part of our FERN cCAP grant (April 2, 7 and 22); and participated in a conference call by the North American Chemical Residue Workshop's organizing committee (April 9).

DR CHRISTINA ROBB served as a judge for the Sigma Xi Student Research Symposium at Quinnipiac University (April 22).

MR. JOSEPH HAWTHORNE, along with **DR. CHRISTINA ROBB**, attended the Laboratory Safety Institute's 2-Day Laboratory Safety Course in Monroe, CT (April 6-7).

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ENTOMOLOGY

DR. KIRBY STAFFORD III was visited by Dr. Maria Diuk-Wasser, Columbia University, to discuss collaborative research projects (April 2); was interviewed about the Southern pine beetle by Bill Leukhardt, Hartford Courant (April 2) by Mike Patrick, Republican American (April 6), and by Bob Miller, Danbury News Times (April 6); was visited by Dr. Michael Levin, CDC - Atlanta (April 8); met with the candidate for the Weed Scientist position, Dr. Jatinder Aulakh (April 9); was interviewed about tick management by Kathleen G. Connolly, Lawncare.About.com (April 14); was interviewed by Janet Marinelli for an article on tick management (April 15); was interviewed about the Southern pine beetle by Patrick Skahill, WNPR, CT Public Radio (April 16); was interviewed about overwintering tick survival by Ann Slokin, WFSB, Channel 3 News (April 16); was interviewed about overwintering tick survival by Tim Hahn, Channel 12 News (April 17); spoke on ticks and tick-borne diseases at the Westport Library (70 attendees) (April 21); provided a Station and honey bee product registration update at the meeting of the Backyard Beekeepers Association in Weston (100 attendees) (April 28); and with **Dr. Kimberly Stoner**, introduced the Lockwood Lecture speaker, Sam Droege (April 29).

MR. MARK CREIGHTON gave a workshop on putting a new bee package in a hive at Massaro Community Farm in Woodbridge (25 new beekeepers attended) (April 18); attended a workshop on Top Bar hives at the Back Yard Beekeepers Association's Bee Yard in Weston (April 19); spoke about pollinators and the role honey bees play in agriculture at the Earth Day event held at Natureworks in Northford (spoke to 75 attendees) (April 25 and 26); and submitted a Grant Application to the Connecticut Department of Agriculture on Youth and Minority Beekeeping (April 16).

DR. DOUGLAS DINGMAN gave a lecture titled "*E. coli* Concerns" at the University of St. Joseph in West Hartford (April 7); judged the student poster presentations at the Quinnipiac Sigma Xi Conference held at Quinnipiac University in Hamden (April 22); and gave a presentation/demonstration of beekeeping equipment and practices to 5th graders for Arbor Day at CAES (April 24).

MS. KATHERINE DUGAS with Jeff Fengler, Steve Sandrey, Vicki Smith, and Peter Trenchard, attended the combined meeting of the Eastern Plant Board, the Horticultural Inspection Society, and the Cooperative Agricultural Pest Survey, held at the Harborside Hotel in Portsmouth, NH (90 participants) (April 6-9); staffed a Forest Pest Outreach booth at North Haven Earth Day (100 guests stopped by the booth) (April 11); spoke at the Master Gardeners Hot Topics on emerald ash borer management; the talk was also taped so that it will be available online (90 Master Gardeners attended) (April 15); spoke about emerald ash borer management and Southern pine beetle at the Flanders Nature Center in Woodbury (10 attendees) (April 16); and staffed a Forest Pest Outreach booth at Hamden Earth Day (200 guests stopped by the booth) (April 18); and staffed a booth at UConn's Earth Day and Arbor Day celebrations and spoke to students about emerald ash borer and other forest pests; twenty ash trees on UConn's Storrs campus were tagged as part of the program (April 22).

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DR. GALE RIDGE was published in the Hartford Courant under the headline “Pesky Pests Become An Epidemic.” The article was about bed bug management in Connecticut (April 6); was interviewed about Powassan Virus and Lyme disease transmitted by the black legged tick by Larry Rifkin of WATR (April 14); in collaboration with Sherill Baldwin of DEEP and Justine Fallon of the Mattress Recycling Council, she published an informational trifold addressing bed bugs, to help transfer station attendants cope with handling recycled mattresses that are bed bug infested. This is part of a recently passed mattress recycling law in Connecticut (April 14); spoke about bed bug to nurses of the Department of Developmental Services in Wallingford (45 attendees) (April 15); teleconferenced from her desk at the Station a talk on bed bugs and school management with West Hill School in Rocky Hill. Staff members from other area schools, the Board of Education, and the Health Department attended the talk (60 attendees) (April 20); and spoke to two school groups visiting the insect information office as part of the celebration of Arbor Day at the Station (April 24).

DR. CLAIRE RUTLEDGE was interviewed about Southern pine beetle by Tony Terzi, FoxCT (aired April 1); gave a talk titled “Emerald ash borer in Connecticut” to the Litchfield Hills Audubon Society at the Litchfield Community Center (45 adult attendees) (April 6); was interviewed about Southern pine beetle by Michael Puffer, Waterbury Republican-American (April 7; story published April 13); met with a group from the Vermont Department of Forests, Parks and Recreation for a tour of the University of Connecticut’s Biodiversity Research Collections in Storrs (April 10); was interviewed about Southern pine beetle by John Silva, WTIC AM 1080 (April 13); was interviewed about Southern pine beetle by Sujata Jain, WFSB, Eyewitness News 3 (aired April 13); was interviewed about Southern pine beetle by Tina Detelj, WTNH, News 8 (aired April 14); gave a talk titled “Biosurveillance, finding an invasive beetle with a native wasp” to the Master Gardeners class at the UConn Cooperative Extension Center in Bethel (50 adult attendees) (April 16); gave a guest lecture on “Detection and biological control of Emerald ash borer in Connecticut” in the course Integrated Pest Management, taught by Dr. Ana LeGrand, at UConn in Storrs (30 adult attendees) (April 21); gave a talk “Emerald ash borer in Connecticut” to the group “People Enjoying People” at the Calvary Presbyterian Church in Enfield (25 adult attendees) (April 21); gave talks on invasive insects to two groups of 5th graders, one from Chester and one from Eastford, visiting the Station for the Arbor Day celebration (50 youth and 15 adult attendees) (April 24); and was interviewed about Southern pine beetle by Steve Singer, Associated Press, Hartford (April 30).

DR. VICTORIA SMITH, KATHERINE DUGAS, JEFF FENGLER, STEVE SANDREY, and **PETER TRENCHARD** attended the combined meeting of the Eastern Plant Board, the Horticultural Inspection Society, and the Cooperative Agricultural Pest Survey, held at the Harborside Hotel in Portsmouth, NH. Vicki presented at talk titled “CWR Update,” and Peter presented an update on Boxwood blight (90 participants) (April 6-9).

DR. KIMBERLY STONER was a guest for two hours on the radio show “Garden Talk” on WTIC, speaking about planting native plants for pollinators. The host, Scott Reil, said that the ratings for the show indicate an average of 35,000 listeners (April 4); gave a talk titled “The buzz about bees” at the Salt Meadow Unit of the Stewart B. McKinney National Wildlife Refuge in Westbrook (30 attendees) (April 10); participated in the annual project meeting of the Northeast Pollination Security Project at the University of Massachusetts in Amherst, MA (April 14); gave the keynote lecture, “Gardening for Bees” at the annual “Hot Topics” session for the Connecticut Master Gardener program at the UConn campus in West Hartford (120 attendees) (April 15) and the talk was recorded on video so that an additional 200 Master Gardeners will see the talk by the end of June; presented a talk on “Gardening for Bees” to the Institute for Learning in Retirement in New Haven (7 attendees) (April 22); arranged for a Lockwood Lecture given by Sam Droege titled “The Natural History Gap and the Citizen” in Jones Auditorium (April 29).

MS. TRACY ZARRILLO hosted Sam Droege during his visit to the Station (April 28-30). He visited her laboratory, helped with bee identification, and gave a Lockwood Lecture on April 29.

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO visited with Prof. Paige Novak, The Biotechnology Institute, University of Minnesota, to discuss mutual research interests (April 22); accepted award for Best Paper of the Year from the Quinnipiac Chapter of the Sigma Xi at their annual meeting in Hamden (April 22); and gave the keynote address, “Biochar—Research at the CAES on its Potential Uses”, at the Annual Meeting of the Experiment Station Associates (approximately 40 attendees) (April 8).

DR. PHILIP ARMSTRONG presented research findings at the Annual Meeting of the Northeastern Multistate Research Project titled Biology, Ecology and Management of Emerging Disease Vectors (approximately 12 attendees) (April 1); was interviewed by the New Haven Register about detection of Powassan virus in Connecticut ticks (April 8); was interviewed by Cablevision News 12 about Powassan virus in risk in Connecticut (April 9); and was interviewed by News Channel 8 about Powassan virus (April 10 and 14).

MR. GREGORY BUGBEE gave a talk entitled “Green Lawns and Clear Water – Lawn Care for the Environmentally Conscious” for an Earth Day observance at the Middletown Community Center (approximately 25 attendees) (April 22); spoke on “Improving Soil in the Home Garden” to gardeners at the Towers Senior Center in New Haven (approximately 25 attendees) (April 14); gave a talk entitled “Lawns Care” as part of a gardening program sponsored by the Cragin Library in Colchester (approximately 25 attendees) (April 13); and published an article, Invasive Plants and Water Chemistry in Connecticut Lakes: Developing a Risk Assessment Tool, in National Water Quality Monitoring News, Spring 2015.

DR. GOUDARZ MOLAEI, along with **DRS. PHILIP ARMSTRONG** and **DOUB BRACKNEY** and Director **THEODORE ANDREADIS**, met with Dr. Albert Ko, of the Yale School of Public Health to discuss collaboration (April 10); and, along with **DR. SCOTT WILLIAMS** and **MICHAEL THOMAS**, led graduate students, postdoctoral fellows and faculty of the Yale School of Public Health on tours of the CAES mosquito and tick study sites in Chester and Madison, as well as the relevant CAES laboratories in New Haven (10 attendees) (April 18).

MR. JOHN SHEPARD presented a display on the Mosquito Trapping and Testing Program, West Nile Virus, Eastern Equine Encephalitis, and mosquito biology at “Bitten! Bloodsuckers & Climate” at the Yale Peabody Museum of Natural History (approximately 1,500 museum visitors) (April 16); and spoke about the mosquito life cycle and the Mosquito Trapping and Testing Program to a group participating in the CTPA Arbor Day Tree Planting Ceremony (approximately 30 attendees) (April 24).

DR. BLAIRE STEVEN gave a talk “From the Very Large to the Extremely Small: Including Microbiology in Climate Models” on April 10th at Albertus Magnus College. (approximately 15 students and 3 faculty attended) (April 10); gave an invited talk “From the Very Large to the Extremely Small: Including Microbiology in Climate Models” in the Henry Voegeli Seminar Series in Microbiology at the University of New Haven (approximately 20 students and 10 faculty attended) (April 30); and gave a talk entitled “A Microbial Ecological View of sudden Vegetation Dieback in a Connecticut Wetland” he New England Estuarine Research Society Spring Meeting in Bristol, Rhode Island (approximately 100 attendees) (April 16-18).

DR. CHARLES VOSSBRINCK helped judge the Student Research Symposium sponsored by the Quinnipiac Chapter of the Sigma Xi at Quinnipiac University (April 22).

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FORESTRY AND HORTICULTURE

DR. JEFFREY WARD met with Nick Zito, forester for Regional Water Authority, to discuss forest management (April 22); spoke on how trees grow to 5th grade students at the Arbor Day celebration (30 students, 15 adults) (April 24); visited by Richard Chiaromonte, President Stamford Land Conservation Trust, to discuss forest management on private lands (April 24); and met with Bruce Villwock and James Barnes (Conn DOT) and Tom Degan (Burns and McDonnell) in Monroe to discuss roadside forest management (April 30)

DR. ADRIANA ARANGO VELEZ gave an interview “Tiny, invasive beetles threaten state’s pines” for the Waterbury-Republican American (April 7); interviewed by WTNH News8 about mechanisms used by pine trees to defend beetle attack, and how beetles and pathogenic fungal associates work together to overcome tree defenses (April 14); and participated in the Judges Committee at the Quinnipiac University Student Research conference sponsored by Sigma Xi (April 22).

DR. ABIGAIL MAYNARD assisted Lower School teachers in planning springtime garden projects at Hamden Hall Country Day School (5 teachers) (April 16); attended a meeting at the Station with Richard Fu from Agrovolution to discuss indoor vertical vegetable farming (with Charles Voosbrink and Theodore Andreadis) (April 17); and reported on Station activities at a quarterly meeting of the Council on Soil and Water Conservation in Middletown (23 adults) (April 21).

DR. SCOTT WILLIAMS gave a talk titled "Deer Damage Management Options" to the Spring 2015 Study Group of the Institute for Learning in Retirement, New Haven (7 attendees) (April 15); at the invitation of Dr. Goudarz Molaei, gave a blacklegged tick flagging demonstration and field lecture to graduate students class in the Biology of Disease Vectors class from the Yale University School of Public Health, Madison (9 attendees) (April 18); hosted the Annual Meeting of the Executive Board of the Northeast Section of The Wildlife Society, Newport, RI (April 19); hosted the Annual Meeting of the Northeast Section of The Wildlife Society, Newport, RI (April 20); attended the 71st Annual Northeast Fish and Wildlife Conference, Newport, RI (April 19-21); gave an invited lecture about environmental careers at Middlesex Community College, Middletown (10 attendees) (April 28); and participated in Lyman Hall High School agricultural program compliance review, Wallingford (April 29).

MR. J.P. BARSKY met with collaborators from Audubon Connecticut, Connecticut Department of Energy and Environmental Protection, and Ferrucci and Walicki to discuss the “Forest for the Birds” project in Southbury (7 professionals) (April 9).

MR. MICHAEL SHORT attended the 71st Annual Northeast Fish & Wildlife Conference, Newport RI (April 19-21) and presented a poster “Relationship between acorn abundance and adult tick *Borrelia* infection in Japanese barberry stands in Connecticut” at the 71st Annual Northeast Fish & Wildlife Conference, Newport RI (250 attendees) (April 20).

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PLANT PATHOLOGY AND ECOLOGY

DR. DONALD AYLOR gave an invited talk titled “Aerial Dispersal of Pollen and Spores” in the Department of Civil and Environmental Engineering at the Massachusetts Institute of Technology (MIT) in Cambridge, MA (30 adults attended) (April 2).

DR. SHARON DOUGLAS gave a presentation titled “Pruning for the home gardener” as part of the Institute for Learning in Retirement Short Course “Garden Care and Our Environment” (10 adult attendees) (April 15); and gave a presentation titled “Eco-friendly management of diseases of perennials” for the Franklin Garden Club in Franklin (25 adult attendees) (April 15).

DR. WADE ELMER attended the New England Estuarine Research Society Meeting in Bristol, where his graduate student, Magali Bazzano, presented the talk “Using DMSP as an Indicator for Stress in Salt Marshes Affected by Sudden Vegetation Dieback” (April 17) and was interviewed about experiences working with high school students from the Sound School by Josef Graham, a doctoral student at Western Connecticut State University (April 29).

DR. YONGHAO LI gave a talk titled “Common Diseases in Woody and Herbaceous Ornamentals” for the 2015 Study Group of the Institute for Learning in Retirement in New Haven (4 attendees) (April 29).

DR. ROBERT MARRA participated in a discussion and luncheon with members of the Yale School of Forestry and Environmental Studies to discuss opportunities for collaborations and interactions between CAES and YSFES in Jones Auditorium (April 13).

DR. NEIL SCHULTES organized the judging for the Fourth Annual Student Research Conference hosted by Quinnipiac Sigma Xi Chapter. Other members of the Department of Plant Pathology and Ecology who served as judges were **DRS. WADE. ELMER, RICHARD PETERSON, LINDSAY TRIPLETT, and QUAN ZENG**. Additional judges from CAES were **Dr. Adriana Arango-Velez** (Dept. of Forestry & Horticulture), **Drs. Douglas Brackney, Blaire Steven, Charles Vossbrinck** (Dept. of Environmental Science), **Dr. Douglas Dingman** (Dept. of Entomology) and **Dr. Christina Robb** (Dept. of Analytical Chemistry) (April 22).

VALLEY LABORATORY

DR. CAROLE CHEAH gave a presentation at the Forest Health Monitoring Workshop in Burlington on “Adaptation and spread of *Rhinoncomimus latipes*, introduced for biological control of Mile-Minute Weed in Connecticut” (60 people) (March 3); and conducted a laboratory tour at the Valley Laboratory, Windsor and together with Dr. DeWei Li, discussed hemlock woolly adelgid project possibilities for the Holster Scholars First Year program with Nick Russo, undergraduate student, and Dr. Morgan Tingley, avian ecologist from UCONN (March 10).

DR. RICHARD COWLES presented “Christmas tree insect update” to the CT Christmas Tree Growers’ annual meeting, Middletown, (50 attendees) (March 7); provided a video for remote presentation of “Making pesticides work: Interactions of formulations and application techniques” and provided phone Q&A for the CT Groundskeepers Association, (200 attendees) (March 10); and participated in the Red Tomato annual meeting and presented “Neonics and bees: What does the science say?” at Hyde Park, NY (50 attendees) (March 11).

DR. JAMES LAMONDIA met with Wisconsin horticulturalist Michael Yanny to talk about boxwood blight research and boxwood breeding (March 4); examined candidates for the Connecticut arborist license and participated in the quarterly meeting of the Connecticut Tree Protection Examining Board in New Haven (March 11); and participated in Agriculture Day at the Capital, speaking about the 2014 Century Farm Award and Holdridge Farm Nursery (100 people) (March 18).

DR. DEWEI LI participated in a meeting of advisory board and research team for “Recovery from Catastrophic Weather -Hurricane Sandy: Mold Exposure and Health-Related Training project” held at UCONN Health Center, Center for Indoor Environments and Health in Farmington, CT (March 13); and participated in the indoor air quality meeting of the Connecticut Institute for Clinical and Translational Research (CICATS), and represented CICATS’s Occupational Safety and Health Core Interest Group (OSH CIG) at the UCONN Health Center (March 25).

NEW SCIENTIST AT THE VALLEY LABORATORY

Dr. Katja Maurer recently joined the Valley Laboratory as a Postdoctoral Research Scientist. She will be conducting research on hops and hop diseases, and boxwood blight. Dr. Maurer is a plant microbiologist with expertise in phytopathology, microbiology and biological control. Her research focuses on the effects of phytopathogens on plants, the investigation of plant-associated microbial communities and the evaluation of environmentally friendly plant protection approaches. She established a new molecular detection assay based on real-time PCR for identifying the pathogen *Verticillium* spp. in hops and assessed biological control as a promising plant protection strategy against hop wilt in Bavarian hop gardens. In former studies, she investigated microbial communities associated with Mediterranean olive trees to characterize the microbiome and to find antagonists against *V. dahliae* by screening plant-associated microorganisms. Dr. Maurer did her doctorate in Molecular Bioscience and Biotechnology (2014) at the Bavarian State Research Center for Agriculture (Germany) in cooperation with the Technical University Graz, Austria. She studied Biotechnology (MSc) and Chemistry (BSc) at the Technical University Graz, Austria.

DEPARTMENTAL RESEARCH UPDATES APRIL 2015

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Bennett, J.; Bhattacharyya, S.; Chauhan, A.; Grese, H.; Heintz, M.E.; Latshaw, M.W.; Martins, C.; Peterson-Wright, L.; Rice, D.; Smith, C.; Theisen, T.S.; Wangsness, K.; **White, J.C.**; Wichman, M.D. 2015. *Nanotechnology and Environmental Health Laboratories: White Paper*. http://www.aphl.org/AboutAPHL/publications/Documents/EH_NanotechnologyWhite Paper_42015.pdf.

ABSTRACT: In 1959, Dr. Richard Feynman gave a speech to the American Physical Society titled, “There’s Plenty of Room at the Bottom.” In those remarks, Dr. Feynman suggested, “Atoms on a small scale behave like nothing on a large scale, for they satisfy the laws of quantum mechanics. So, as we go down and fiddle around with the atoms down there, we are working with different laws, and we can expect to do different things.”¹ Dr. Feynman was exactly right — materials on a small scale behave differently than their large-scale counterparts, and today, purposefully engineered nanomaterials are being used in an increasing number of materials and processes. In the decades since his speech, the “nanotechnology” industry that Dr. Feynman forecasted has emerged and developed exponentially. This white paper provides a “primer” to public and environmental health laboratorians and professionals interested in nanotechnology. To summarize the entire field in one paper is impossible. Instead, what follows is a high-level overview of selected topics that includes references to point the reader to additional information. The paper addresses topics such as toxicity, laboratory methods, exposure, regulations and more. However, this paper only scratches the surface of the field of nanotechnology and should be viewed as a starting point only. Every day, new information, materials and experiments provide more information on the field. Readers are encouraged to find the latest information on the topic(s) of interest to develop detailed knowledge of the field.

Guo, H.; Zhang, Z.; Xing, B.; **Mukherjee, A.**; **Musante, C.**; **White, J.C.**; He, L. 2015. Analysis of silver nanoparticles in antimicrobial products using Surface Enhanced Raman Spectroscopy (SERS). *Environ. Sci. Technol.* DOI: 10.1021/acs.est.5b00370.

ABSTRACT: Silver nanoparticles (AgNPs) are the most commonly used nanoparticles in consumer products. Concerns over human exposure to and risk from these particles have resulted in increased interest in novel strategies to detect AgNPs. This study investigated the feasibility of Surface-enhanced Raman Spectroscopy (SERS) as a method for the detection and quantification of AgNPs in antimicrobial products. By using ferbam (ferric dimethyl-dithiocarbamate) as an indicator molecule that binds strongly onto the nanoparticles, AgNPs detection and discrimination were achieved based on the signature SERS response of AgNPs-ferbam complex. SERS response with ferbam was distinct for silver ions, silver chloride, silver bulk particles, and AgNPs. Two types of AgNPs with different coatings, citrate and polyvinylpyrrolidone (PVP), both showed strong interactions with ferbam and induced strong SERS signals. SERS was effectively applicable for detecting Ag particles ranging from 20 nm to 200 nm, with the highest signal intensity in the 60-100 nm range. A linear relationship ($R^2 = 0.9804$) between Raman intensity and citrate-AgNPs concentrations (60 nm; 0-20 mg/L) indicates the potential for particle quantification. We also evaluated SERS detection of AgNPs in four commercially available antimicrobial products. Combined with ICP-MS and TEM data, the results indicated that the SERS response is primarily dependent on size, but also affected by AgNPs concentration. The findings demonstrate that SERS is a promising analytical platform for studying environmentally relevant levels of AgNPs in consumer products and related matrices.

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D. W. Dingman. 2015. Comparative analysis of *Paenibacillus larvae* genotypes isolated in Connecticut. *Archives Microbiol.* DOI 10.1007/s00203-015-1113-4.

ABSTRACT: Ninety-six strains of *Paenibacillus larvae*, causative agent of American foulbrood in honey bee (*Apis mellifera*) larvae, collected from Connecticut, USA (CT), honey bees, and 12 *P. larvae* strains not from CT, were genotyped via ERIC-PCR and *Xba*I-RFLP analysis. All CT-isolates, five strains isolated in South America, three strains from North America (not CT), and one strain isolated in Australia grouped into the ERIC I genotype. Three *P. larvae* formerly subsp. *pulvifaciens* strains grouped into ERIC III and IV genotypes. *Xba*I-RFLP genotyping showed three genotypes within the CT-isolates, and two were identified as *Xba*I-RFLP Type I and III. The third *Xba*I-RFLP genotype (Type Ib) represented one of four new *Xba*I-RFLP genotypes identified. Comparison of genotype results for the *P. larvae* strains tested was used to develop a correlation between ERIC-PCR genotyping and *Xba*I-RFLP genotyping. Sixteen CT-isolates were tetracycline-resistant and demonstrated PCR amplification using oligonucleotide primers for *tetL*. All 16 isolates grouped within *Xba*I-RFLP Type Ib, suggesting limited introduction of a tetracycline-resistant strain into CT.

Li, Yonghao. Downy mildew of basil. *CAES Fact Sheet.*

ABSTRACT: Basil downy mildew is a new, destructive disease in the United States that causes significant quality and yield losses in field- and greenhouse-grown basil crops, as well as in home gardens. This fact sheet discusses disease diagnosis and management strategies.

Li, Yonghao. Foliar diseases of Christmas trees and their management. *The Real Tree Line.*

ABSTRACT: Needlecast and rust diseases can cause severe yield, quality, and economic losses in Christmas tree production. Correct disease diagnosis and understanding disease development are essential to effective management of these diseases. This article discusses common foliar diseases of Christmas trees and strategies for their control.

Giordano, P. R., **Zeng, Quan**, Dykema, N. M., Detweiler, A. R., and Vargas, J. M. First report of *Xanthomonas translucens* causing wilt disease on perennial ryegrass (*Lolium perenne*) in the United States. *Plant Disease.* <http://apsjournals.apsnet.org/doi/abs/10.1094/PDIS-01-15-0127-PDN>

ABSTRACT: Bacterial wilt is a serious disease on golf course putting greens. It was previously reported on only creeping bentgrass and annual bluegrass species. Dr. Zeng, in collaboration with Dr. Joe Vargas' turf grass pathology lab at Michigan State University, for the first time diagnosed the bacterial wilt disease on ryegrass in the U.S., and determined the causal agent as *Xanthomonas translucens*. Dr. Zeng will continue to investigate the emergence and host specificity of this important turf grass disease using comparative genomics and genetics approaches.

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Wang Y, Hyde K D., McKenzie E H.C., Jiang Y-L, Li De-Wei, Zhao D-G. 2015. Overview of *Stachybotrys* (*Memmoniella*) and current species status. *Fungal Diversity* 71: 17–83. doi:10.1007/s13225-014-0319-0. DeWei Li is the corresponding author.

ABSTRACT: *Stachybotrys* (asexual Hypocreales) has a worldwide distribution. This genus inhabits substrates rich in cellulose and is closely related to *Memmoniella*. Classification of species has previously been based on morphology, with conidial characters being considered as important. This study re-evaluates *Stachybotrys* and *Memmoniella*, which is shown to include at least seven species-groups; while *Memmoniella* is a synonym of *Stachybotrys*. The sexual genera *Ornatispora* and *Melanopsamma* are also synonyms of *Stachybotrys*. With the exception of *Stachybotrys subsimplex*, species formed a well-supported monophyletic group in LSU data analysis belonging to *Stachybotriaceae*. Seventy-four accepted *Stachybotrys* species are discussed, while eight species are considered to belong to other genera or are doubtful in this paper and a key to these species provided. Twelve new combinations and 1 nomina nova is proposed. The status of *Stachybotrys* species on health, as human or animal pathogens, in indoor environments, and use as biocontrol agents and compound discovery are also discussed.

JOURNAL ARTICLES APPROVED APRIL 2015

Bugbee, Gregory J., and Jordan A. Gibbons. Invasive aquatic plant monitoring report 2013: Candlewood Lake, Lake Lillinonah, Lake Zoar. *Station Bulletin*

Li, Yonghao. Foliar diseases of Christmas trees and their management. *The Real Tree Line (CCTGA)*

Cohen, Allen C., and **Carole A.S.-J. Cheah.** Interim diets for specialist predators of hemlock woolly adelgids. *Entomology, Ornithology and Herpetology*

Magyar, D., M. Vass, and **De-Wei Li.** Dispersal strategies of microfungi. Book Chapter, *Biology of Microfungi*

Molaei, Goudarz, Philip Armstrong, Charles Abadam, Karen Akaratovic, Jay Kiser, and **Theodore Andreadis.** Vector-host interactions of *Culiseta melanura* in a focus of eastern equine encephalitis virus in southeastern Virginia. *PLOS ONE*

Maier, Chris. Mapping of populations of 17-year periodical cicadas. *Connecticut Wildlife*

Li, Yonghao. Downy mildew of basil. *CAES Fact Sheet*

Rutledge, Claire. Biological control of emerald ash borer in Connecticut. *Connecticut Wildlife*

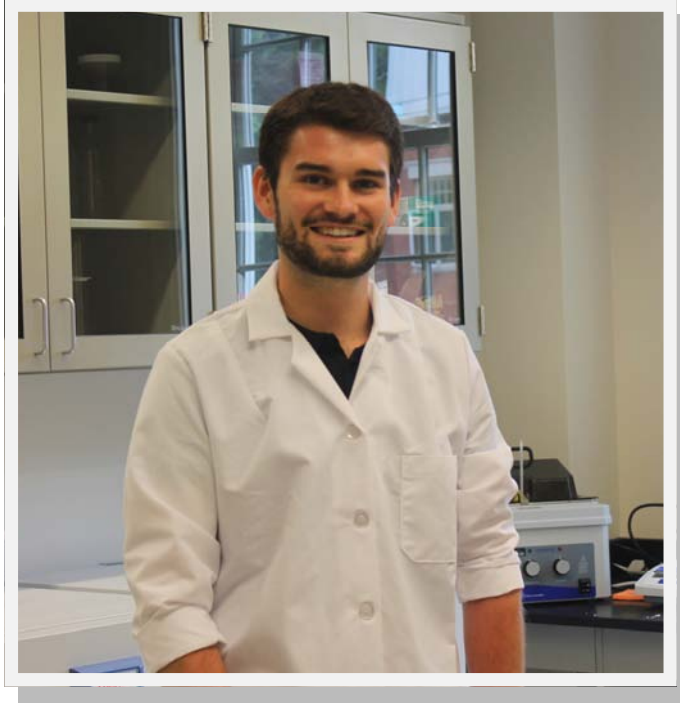
Ma, C., S. Chhikara, R. Minocha, S. Long, **C. Musante, J. C. White,** B. Xing, and O. Parkash-Dhanker. Reduced silver nanoparticle phytotoxicity in *Crambe abyssinica* with enhanced glutathione production by overexpressing bacterial γ -glutamylcysteine synthase. *Environmental Science & Technology*

Sillen, W., S. Thijs, G. R. Abbamondi, J. Janssen, N. Weyens, **J. C. White,** and J. Vangronsveld. Effects of silver nanoparticles on soil microorganisms and maize biomass are linked in the rhizosphere. *Soil Biology & Biochemistry*

STATION NEWS

The Connecticut Agricultural Experiment Station

ARTICLES OF INTEREST APRIL 2015



Valentin Trouiller is a visiting student in the laboratory of Dr. Lindsay Triplett from April 13 to October 2, 2015. He is a Master's student in Agronomy at Blaise Pascal University in Clermont-Ferrand, France. He will help map a new disease resistance locus in rice as part of his degree. Valentin grew up on a horse ranch in France, where he competes in carriage driving competitions and also serves as a volunteer firefighter.

STATION NEWS

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The Connecticut Agricultural Experiment Station (CAES) and the newly renovated Jenkins-Waggoner Laboratory were selected for the CT Tree Protective Association's (CTPA) 2015 Arbor Day Celebration on Friday, April 24, 2015. The event was coordinated by Charlie Iselin, Chair, CTPA Arbor Day Committee, and Dr. Sharon M. Douglas, CAES. CTPA celebrates Arbor Day each year by planting a tree with the assistance of the winners of its Arbor Day Poster Contest. Fifth grade students in every county of Connecticut were asked to submit posters based on the theme *My Favorite Tree in My Town*. Poster winners from each county were invited to the tree planting ceremony at CAES, during which the posters were on display and each winner was recognized for their artwork. Winner also participated in the redbud planting. All winning posters will be posted on the CTPA web site (www.ctpa.org). In addition to the tree planting ceremony, many attendees enjoyed tours of Jenkins-Waggoner led by Dr. Douglas and Ms. Vickie Bomba-Lewandoski and heard about CAES research programs and services from Dr. Jeff Ward, Dr. Gale Ridge, Ms. Lindsay Patrick, Dr. Lindsay Triplett, Dr. Claire Rutledge, Dr. Doug Dingman, and Mr. John Shepard.



Planting the redbud tree for the CTPA-CAES Arbor Day 2015.



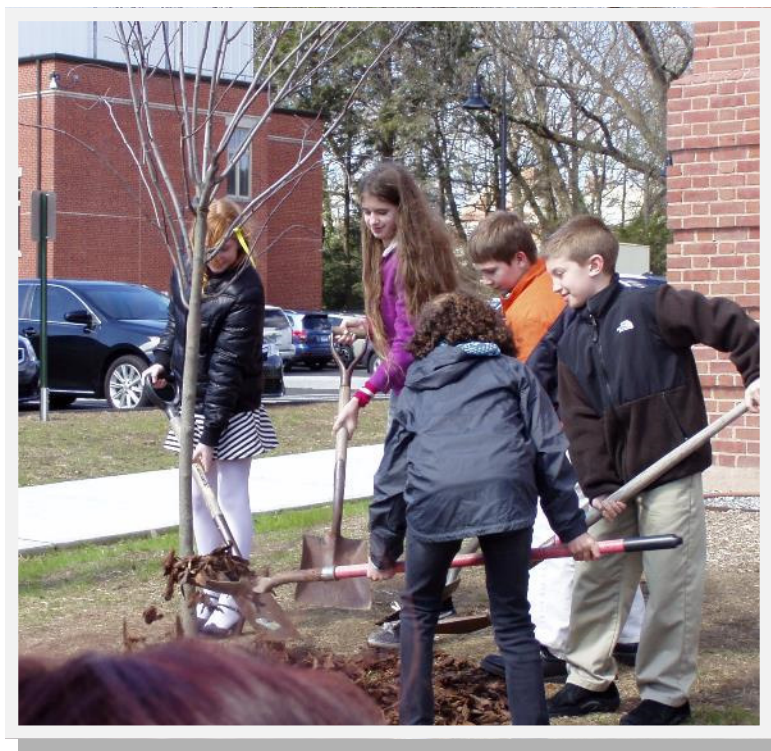
Winning posters for CTPA Arbor Day 2015 were on display at the ceremony.

STATION NEWS

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A standing-room only crowd consisting of contest winners, their 5th grade classmates and teachers, and proud family members celebrated Arbor Day at CAES.



Winners shoveled mulch around the newly planted redbud.

STATION NEWS



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GRANTS RECEIVED APRIL 2015

DR. SCOTT WILLIAMS was awarded a \$7,000 grant from Bobbex, Inc. to test experimental deer repellent (April 22)

DR. DEWEI LI received \$2500 from the project “Recovery from catastrophic weather: Hurricane Sandy mold exposure and health-related training” of UCONN Health Center supported by from the Centers for Disease Control and Prevention’s National Institute for Occupational Safety and Health (NIOSH) (1U01OH010627-01).

DR. JAMES LAMONDIA received funding for Boxwood blight mitigation research from USDA APHIS through Farm Bill funding (\$97,927).

DR. RICHARD COWLES and cooperator **DR. BRIAN EITZER** of the Analytical Chemistry Department were awarded a \$54,000 grant from the Horticultural Research Institute as a part of the national Horticultural Industry Bee & Pollinator Stewardship Initiative.

**THE
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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

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