

Station News

The Connecticut Agricultural Experiment Station
Volume 7 Issue 4 April 2017



This Issue

The mission of The Connecticut Agricultural Experiment Station is to develop, advance, and disseminate scientific knowledge, improve agricultural productivity and environmental quality, protect plants, and enhance human health and well-being through research for the benefit of Connecticut residents and the nation. Seeking solutions across a variety of disciplines for the benefit of urban, suburban, and rural communities, Station scientists remain committed to "Putting Science to Work for Society", a motto as relevant today as it was at our founding in 1875.



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ADMINISTRATION

DR. THEODORE ANDREADIS participated in the spring meeting of the Northeastern Regional Association of State Agricultural Experiment Station Directors held in Baltimore, MD (March 14-15); presented welcoming remarks and an overview of the Experiment Station and its various research, regulatory and public service programs to the Landscape Design School held at the Station (March 20); and presented an update on the Northeast Regional Center for Excellence in Vector Borne Diseases at the 14th Arbovirus Surveillance and Mosquito Control Workshop and participated as Administrative Advisor in the annual meeting of Multi-State Project, NE-1443, *Biology, Ecology & Management of Emerging Disease* held in St. Augustine, FL (March 28-30).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE participated in the FERN-wide 50-state teleconference call (March 2); attended the monthly Laboratory Preparedness meeting at the CT Department of Public Health Laboratory in Rocky Hill (March 6); participated in a teleconference call for the FERN Method Coordination Committee regarding review of an LC-MS poison screen submitted by FERN cCAP (March 8); participated in a teleconference call with representatives of the NSF-funded Center for Sustainable Nanotechnology to discuss potential collaborative research and a Center-funded CAES Post-doctoral Associate (March 9); participated in an APHL-sponsored teleconference call regarding a peer reviewed manuscript submission focused on nanotechnology and water treatment to the *Journal of the American Water Works Association* (JAWWA) (March 10); met with investigators from the Yale Police Department regarding samples from a recent potential poisoning case (March 10); along with **DR. BRIAN D. EITZER AND MS. TERRI ARSENAULT**, attended the annual FDA FERN cCAP Technical Meeting in Kansas City, MO and gave a lecture on a recent poisoning case that the laboratory was involved with and an update on our participation in the FDA EU Milk Assignment (55 attendees) (March 14-16); spoke with Commissioner of Agriculture Steven Reviczky regarding joint participation in the FDA Produce Safety Rule (March 17); along with **MS. KITTY PRAPAYOTIN-RIVEROS** participated in an FDA ISO MFRPS quarterly call (March 21); along with **MS. KITTY PRAPAYOTIN-RIVEROS** participated in an FDA ISO AFRPS quarterly call (March 21); along with **MS. KITTY PRAPAYOTIN-RIVEROS** participated in an A2LA webinar on the upcoming revision to the ISO 17025 Standard (March 22); spoke by phone with Ms. Lilebet Foster regarding potential participation in the World Science Fair in New York City this May on a program involving nanotechnology (March 23); met at Southern CT State University with Biology faculty and students to discuss Department of Analytical Chemistry research and programs (20 attendees) (March 29); and hosted members of the NSF-funded Center for Sustainable Nanotechnology from the University of Wisconsin and University of Minnesota and discussed future collaborative research, including a Center-funded Post-doctoral Associate and visiting graduate students (March 30).

DR. BRIAN D. EITZER was a participant in the North American Chemical Residue Workshops' organizing committee conference call (March 9); attended the annual FDA FERN cCAP Technical Meeting in Kansas City, MO (March 14-16); was a participant in the Protecting Pollinators with Economically Feasible and Environmental-

ly Sound Ornamental Horticulture principal investigator webinar (March 29); and met with Joe Doktorski and Carl Schwarz from Sciex to discuss the analysis of pesticide residues (March 30).

MR. MICHAEL J. CAVADINI along with **MR. GREGORY J. BUGBEE** proctored three invasive species exams for the CT Science Olympiad in Farmington (30 middle school participants) (March 18).



Dr. Jason C. White and **Dr. Wade Elmer** hosted members of the Center of Sustainable Nanotechnology (<https://susnano.wisc.edu/>) for a site visit on March 30 (Dr. Christy Haynes of the University of Minnesota [front center], Dr. Robert Hamers of the University of Wisconsin [front right], Mr. Michael Schwartz of the University of Wisconsin [center back], Jaya Borgatta of the University of Wisconsin [center right] and Natalie Hudson-Smith of the University of Minnesota [center far right]). The Center will be funding a Post-doctoral Associate to work under Dr. White and Dr. Elmer on the use of nanoscale nutrients to suppress crop disease.

DR. KIRBY C. STAFFORD III presented a talk on the gypsy moth at the Forest Health Workshop in Jones Auditorium (48 attendees) (March 7); was interviewed about gypsy moth in 2017 by Judy Benson, The Day New London (March 7); participated and presented on the Tick IPM Working Group conference call (March 8); presented a talk on ticks and tick management at the Essex Library, in Essex (42 attendees); participated in a media press conference with DEEP on the gypsy moth held at CT Forest & Park Association Headquarters in Rockfall and was interviewed by Tony Terzi of Fox61 News, Tina Detelj from Channel News 8, WTNH, Kristen Johnson from NBC CT Channel 3, and Mark Sims, CT Radio (March 23); participated on a conference call with U.S. Biologic Inc. and colleagues in New York and Michigan on the rodent targeted vaccine (March 28); was interviewed by Greg Hladky of the Hartford Courant about gypsy moth (March 27); and with **DR. GOUDARZ MOLAEI**, was interviewed by Fox5, New York about ticks and Lyme disease.

MS. KATHERINE DUGAS attended the Forest Health Workshop held in Jones Auditorium and gave a short talk entitled “CAPS Survey Targets for 2017” (March 7); attended the Master Gardener Association Annual Symposium held at Connecticut College in New London and staffed a table covering CAES, including Forest Pest and CAPS program information (150 attendees) (March 18); and staffed a display table at the Hunting and Fishing Expo at the CT Convention Center in Hartford (March 31-April 2). The table covered invasive insect topics, including Forest Pests and Don’t Move Firewood.

MR. MARK H. CREIGHTON spoke with eighty 2nd grade students at EASTCONN School in Hampton, on the role of bees and pollination (March 1); was invited by Dr. Susan Cusato of Southern Connecticut State University in New Haven to speak with her honors class on the role that bees play in our environment and the use of bees in pollination of agricultural crops (20 students) (March 2); attended the Forest Health Workshop at CAES (March 7); attended the Pollinator Health Workshop at CAES (March 9); spoke on honey bee health related topics to new beekeepers at the Connecticut Beekeepers Association Third Bee School at Housatonic Valley High School in Falls Village (120 attendees) (March 11); attended the Backyard Beekeepers Association meeting in Weston for a talk presented by Dr. Carl Jurka on Rearing Queens in the Northeast and spoke to 180 Beekeepers about honey bee registration (March 28); spoke to 3rd grade students at EASTCONN School in Hampton on the role of bees and pollination (65 students) (March 30); and at the request of Mr. Terry Grant made a presentation at Green Hill School in Bristol to 8th grade students and faculty on the merits of establishing an Apiary and beekeeping program at the school (15 students) (March 31).

DR. GALE E. RIDGE was interviewed about the Gypsy moth outbreak in Ledyard by Heather Burian from NBC (March 20); was interviewed by Tony Terzi Fox 61 News about the Gypsy moth (March 22); an article from an interview on Delusional Parasitosis titled “Accidental therapists: For insect detectives the trickiest cases involve the bugs that aren’t really there” was published in STAT News a subsidiary of the Boston Globe (March 22) (the article was also published on March 24 in an online news service, “BoingBoing bbs,” and on March 29 by the Connecticut Pest Control Association); and lectured on bed bugs at Southern Connecticut State University to students from the Environmental Health Training Program (March 29).

DR. CLAIRE E. RUTLEDGE taught “Tree conditions laboratory” for the Connecticut Tree Protective Association’s Arboriculture 101 class in Wallingford (45 attendees) (March 1); presented the talk “New kid in town, *Agrilus smaragdifrons*” at the Forest Health Workshop in New Haven (60 attendees) (March 7); attended symposium “Southern Pine Beetle in the Northeast” at Brookhaven Laboratory in Upton, NY (March 8); ran a workshop “Winter Tree Identification” in conjunction with the Connecticut Tree Protective Association and Connecticut College Arboretum in New London (48 attendees) (March 16); taught “Insects and mites that attack trees” for Bartlett Arboretum’s Arboriculture 101 class in Stamford (7 attendees) (March 20); and talked with 5th and 6th graders from Fair Haven public schools about insects in New Haven (30 youth, 6 adults) (March 30).

DR. VICTORIA L. SMITH hosted the annual Forest Health Monitoring Workshop, held in Jones Auditorium. Participants included Experiment Station personnel and guests from UConn, DEEP, regional water authorities, and USDA-APHIS Plant Protection and Quarantine. Presentations have been archived at <http://www.ct.gov/caes/cwp/view.asp?a=2826&Q=591230&PM=1> (48 participants) (March 7).

DR. KIMBERLY A. STONER participated in the Steering Committee meeting at the Radisson Hotel, Manchester, NH to plan the New England Vegetable and Fruit Conference for December 2017 with Cooperative Extension staff, growers, and representatives of grower organizations from all of the New England states and New York. Dr. Stoner is organizing and moderating a session on Wildlife Management (31 participants) (March 1); organized a day-long workshop, “Creating and Improving Pollinator Habitat on Your Farm” for growers and beekeepers, and also made two presentations as part of the workshop: “Your Crop Depends on Bees!” and “Protecting Pollinator Habitat from Pesticides” in Jones Auditorium, New Haven (24 participants) (March 9); spoke at the Winter Conference of the Connecticut Northeast Organic Farming Association on “Planting for Crop Pollinators” held at Western CT State University, Danbury (45 attendees) (March 11); convened a meeting of the CT Native Plant, Pollinator, and Wildlife Working Group at the Valley Laboratory in Windsor (9 participants) (March 15); gave a talk on “An Act Concerning Pollinator Health: State Efforts to Protect Pollinators in Connecticut” at the Eastern Branch Meeting of the Entomological Society of America (50 attendees) (March 20); met with the New Haven Urban Farm and Garden Task Force (6 attendees) (March 22); and participated in designing a trail, gardens, and outdoor exhibits on the theme, “Conservation in Your Own Backyard,” at the White Memorial Conservation Center in Litchfield (12 participants) (March 31).

DR. KIRBY STAFFORD at the DEEP-CAES joint news conference on the gypsy moth at the CT Forest & Park Association Headquarters in Rockfall (March 23).



ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO dined with invited seminar speaker Prof. Francois Morel, Department of Chemistry, Princeton University and hosts from Yale Department of Chemical and Environmental Engineering (March 1); met with Prof. Jaehong Kim of Yale Department of Chemical and Environmental Engineering to discuss collaborative research (March 9).

MS. ANGELA BRANSFIELD participated in the American Biological Safety Association (ABSA) Select Agent Users Webinar: Overview of FSAP Inactivation Requirements (March 22).

DR. PHILIP ARMSTRONG attended the Vector-Borne Disease Prevention Task Force Meeting at the Stamford Government Center (20 attendees) (March 15); presented a talk on La Crosse virus in Connecticut at the Arbovirus Surveillance and Mosquito Control workshop in St. Augustine, FL (50 attendees) (March 29); and served as chair at the NE1443: Biology, Ecology, & Management of Emerging Disease Vectors Regional Project Meeting, St. Augustine, FL (30 attendees) (March 31).

MR. GREGORY BUGBEE presented the results of the "CAES IAPP 2016 Monitoring of Mamasco Lake" at the annual Mamasco Lake Association meeting in

Ridgefield (approximately 50 attendees) (March 9); gave a talk entitled "Connecticut's Invasive Aquatic Plant Problem - The State of the State" at the annual meeting of the Northeast Association of Environmental Biologists in Hartford (approximately 75 attendees) (March 16); with **Mr. Michael Cavadini**, proctored the invasive species event at the 2017 Science Olympiad in Farmington (approximately 50 attendees) (March 18); presented the results of the "CAES IAPP 2016 Survey of Bushy Pond" at the Bushy Pond Board of Directors meeting in Clinton (12 attendees) (March 21); with Amanda Massa, gave an Invasive Aquatic Plant Workshop at Three Rivers Community College in Norwich (approximately 50 attendees) (March 22); and presented the results of CAES IAPP surveillance and monitoring of Lakes Candlewood, Lillinonah, Zoar and Squantz Pond to the First-Light Power Resources Technical Committee in New Milford (approximately 18 attendees) (March 24).

DR. GOUDARZ MOLAEI presented an invited talk, "New Threats and Old Enemies: Dynamics of Vector-Host Interactions and the Emergence and Expansion of Arboviruses in the USA" at the Department of Epidemiology of Microbial Diseases, Yale School of Public Health (approximately 60 attendees) (March 2); was interviewed by Jennifer Kaylin, a Yale Medicine newsletter on the role of mosquitoes and birds in transmission and maintenance of arboviruses in the US. (March 2); was interviewed by NBC Connecticut for an article on Lyme disease in Connecticut (March 7); was interviewed by News 8, WTNH on worsening tick disease problems (March 8); presented an invited talk, "*Vector-Host-Pathogen Interactions and the Emergence and Expansion of Arboviruses*" at the Biology Department, Fairfield University (approximately 25 attendees) (March 8); was interviewed by the Connecticut Post on worsening tick disease problems (March 25); and was interviewed by NBC News 4, New York on increase in ticks carrying Lyme (March 27); was interviewed by the Journal Inquirer, on ticks and tick-associated diseases (March 28); and was interviewed by CBS Connecticut on ticks and tick-associated diseases (March 28).

MR. MICHAEL THOMAS assisted a Waterford High School student on several occasions during March with her Connecticut Science Fair Project titled: The Use of Copepods as a Mosquito Control System.

FORESTRY AND HORTICULTURE

DR. JEFFREY S. WARD met with Alexander Amendola, Regional Water Authority, in North Branford to discuss forestry and wildlife research (March 3); chaired the New England Society of American Foresters Executive Council meeting (March 7); participated to the New England SAF, Northeastern Forest Pest Council and Maine Chapter of the Wildlife Society joined meeting "Adapt. Adopt. Advance: Resiliency in Natural Resource Management" in Bangor, ME (March 8-10); spoke to landscape professional about proper tree selection and planting techniques in Farmington (17 attendees) (March 16); spoke on "Right tree, Right place" to Hamden Master Gardeners (10 attendees) (March 21); interviewed about importance of Young Forests by Anna Bisaro of New Haven Register (March 21).

DR. ADRIANA ARANGO VELEZ participated to the New England SAF, Northeastern Forest Pest Council and Maine Chapter of the Wildlife Society joined meeting "Adapt. Adopt. Advance: Resiliency in Natural Resource Management" in Bangor, ME (March 8-10); gave a talk "Drought: Its After-effects, and management strategies for woody ornamentals" at the 2017 Spring Horticultural Forum in Stamford (40 attendees) (March 22); with **DRS. JEFFREY WARD, DR. ROBERTO De La TORRE, MR. J.P. BARSKY,** and **MS. AMANDA MASSA** spoke on research at CAES and provided tours of Station labs to Fair Haven 5th grade (23 students, 2 teachers) and 6th grade (16 students, 1 teacher) in bilingual/English as a 2nd Language classes (March 30).

DR. ABIGAIL A. MAYNARD discussed learning garden with teachers at Hamden Hall Country Day School (3 teachers) (March 1 & 7); discussed New Crops Program with Keith Bishop at Bishop's Orchard in Guilford (March 16); discussed New Crops Program with Joe Viuso at Viuso Farm in Branford (March 20).

DR. SCOTT C. WILLIAMS spoke on medium-sized mammal abundances in suburban settings at the Forest Health Workshop, New Haven (March 7).

MR. JOSEPH P. BARSKY participated in New England Society of American Foresters Executive Council meeting (March 7); participated to the New England SAF, Northeastern Forest Pest Council and Maine Chapter of the Wildlife Society joined meeting "Adapt. Adopt. Advance: Resiliency in Natural Resource Management" in Bangor, ME (March 8-10); with **DR. JEFFREY WARD**, presented a research poster on "Oak success following regeneration harvesting" at the NESAF annual meeting in Bangor, ME (25 attendees) (March 9); participated in the quarterly meeting of the Connecticut State Consulting Committee for Agricultural Science and Technology Education, and provided an update on CAES research (2 teachers, 5 administrators) (March 15).

Drs. Adriana Arango, Roberto De La Torre, and Jeffrey Ward gave a series of talks about science at CAES to thirty-nine students in 5th and 6th grade bilingual classes at Fair Haven School on March 30, 2017. Students were then given a tour of the Entomology (**Dr. Claire Rutledge**), soil testing (**Ms. Amanda Massa**), and plant physiology (**Mr. Joseph P. Barsky**) laboratories.

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Top: Left. **Ms. Amanda Massa** explaining soil mineral analyses. Right. **Dr. Arango** discussing plant/insect/fungus interactions.

Bottom: Left. **Mr. Joseph P. Barsky** explaining an experiment with sugar maples and salinity. Right. **Dr. De La Torre** with the students at the Entomology facilities.

GRISWOLD RESEARCH CENTER

Mr. Robert Durgy attended a meeting of the steering committee for the Connecticut Vegetable and Small Fruit Grower's Conference in preparation for next year's meeting; taught Vegetable Production for Small Scale Farming in Bridgeport (13 attended) (March 25); participated in Griswold High School Career Day discussing with students opportunities in environmental sciences (55 attended) (April 6); taught a University of Connecticut Master Gardener Program class on vegetables in Brooklyn (26 attended) (April 14).

PLANT PATHOLOGY AND ECOLOGY

DR. DONALD E. AYLOR met with the Long Range Transport Research Group at Cornell University and gave an invited seminar entitled “**Aerial Spore Dispersal: Near and Far**” in the department of Plant Pathology and Plant-Microbe Biology at Cornell University (40 adults attended) (March 14-17).

DR. WADE ELMER met with Dr. Victor S. Batista, Professor of Chemistry and Dr. Lisa D. Pfeifferle, Professor of Chemical & Environmental Engineering and Craig Brodersen of Yale School of Forestry at Yale University to discuss and plan delivering engineered nanotubes in plants (March 2); attended the Forest Health Workshop in Jones Auditorium (March 7); participated in a conference call with **DR. JASON WHITE** and members of the Center for Sustainable Nanotechnology (March 9); attended the BIT World Conference on Smart Materials in Bangkok, Thailand, chaired the session “Nanotechnology in the Environment” and presented the talk “Nanoparticles of Plant Micronutrients Suppress Root Disease and Enhance Yield of Vegetables” (12 attended) (March 17), visited staff and faculty at Chiang Mai University in Chiang Mai, Thailand and presented the seminar “Nanoparticles of CuO suppresses soilborne diseases of vegetables”(33 attended, 29 students, 4 adults) (March 21), participated in a “Meet and Greet” session with undergraduate students of Southern Connecticut State University (23 attended, 15 students, 8 adults, (March 29). (14 students) (March 29); along with **DR. JASON WHITE**, met with five members of the Center for Sustainable Nanotechnology in Johnson-Horsfall Laboratory (March 30) to discuss possible collaborations in nanotechnology in agriculture.

DR. YONGHAO LI staffed the “hands-on table” with tree diseases for the Connecticut Tree Protective Association Arboriculture 101 course in Wallingford (36 adults) (March 1); gave a talk titled “Disease Management” in the Connecticut Christmas Tree Growers Association 57th Annual Meeting in Middletown (60 adults) (March 4); gave a talk titled “What’s Happening to Eastern White Pine in the Northeast” for the Forest Health Monitoring Workshop in New Haven (50 adults attendees) (March 7); gave a talk about “Vegetable Diseases and Their Management” in CT NOFA's 35th Annual Winter Conference in Danbury (60 adult) (March 11); gave a talk titled “Common Diseases of Woody Ornamentals” in the Daytime Gardeners Garden Club in North Haven (10 adults) (March 28); participated in the CT Nurserymen’s Foundation (CNF) Scholarship Committee meeting and reviewed applications in New Haven (March 29).

DR. ROBERT MARRA presented a talk on “Nondestructive Assessment of Internal Decay” at the Forest Health Monitoring Workshop in Jones Auditorium (48 adults attended) (March 7); attended the Connecticut Conference on Natural Resources at the University of Connecticut and served on the Steering Committee) (March 13); participated in a conference call with Dr. Ruth Yanai and discussed “Uncertainty Analysis” (March 17); presented the talk “Three Important Tree Diseases of the Northeast” to the Wethersfield Men’s Garden Club at the Wethersfield Community Center in Wethersfield (20 adults attended) (March 27); participated in a meet-and-greet with Southern Connecticut State University undergraduate students, New Haven, CAES (23 attended 15 students, 8 adults) (March 29).

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DR. NEIL SCHULTES participated in a “Meet and Greet” session with undergraduate students of Southern Connecticut State University (23 attended, 15 students, 8 adults) (March 29) and attended the bi-annual meeting for the Institutional Animal Care and Use Committee for the Station (March 30).

DR. QUAN ZENG met with Dr. Shrikant Mane from Yale Center for Genomic Analysis (March 24) and talked to Biology majored undergraduate students at Southern Connecticut State University about potential internship opportunities at CAES (23 attended 15 students, 8 adults) (March 29).

DR. JATINDER S. AULAKH talked about weed management in Christmas trees at the annual meeting of CTGA in Middletown (50 attendees) (March 4); and attended the CIPWG planning committee meeting and CT Invasive Plants Council Meeting in Windsor (March 7).

DR. RICHARD COWLES presented “Insect and Specialty Crop Block Grant update” at the CT Christmas Tree Growers’ Association Annual Meeting, Middletown (50 attendees) (March 4).

MS. ROSE HISKES participated in the Connecticut Invasive Plant Working Group steering committee meeting at the Valley Laboratory in Windsor (March 7).

DR. JAMES LAMONDIA spoke to Windsor Shade Tobacco growers about management of tobacco pathogens, breeding for resistance and strategies to reduce pesticide residues in shade tobacco wrapper leaves (7 attendees) (March 3); conducted the tree identification exam and oral exams for candidates for the Connecticut arborist license and participated in the quarterly meeting of the Connecticut Tree Protection Examining Board in New Haven (March 8); was interviewed about Connecticut cigar wrapper tobacco and research conducted at the Station by Nicole Wetsman, freelance science writer from New York (March 16); participated in Agriculture Day at the Capitol, speaking about the 2016 Century Farm Award, presenting the 2017 Outstanding Young Farmer Award to Arthur Spielman and the Agricultural Journalism Awards to Jim Altman and Josh Hartmann of Fox 61 (100 attendees) (March 17); participated in a tour of Smokedown Hop Farm in Sharon (15 attendees) (March 18); participated in a steering committee meeting to develop an agenda for the Connecticut Vegetable and Small Fruit Growers Conference in Vernon (March 22); and participated in a meeting of the Connecticut Agricultural Information Council at the Valley Laboratory (March 30).

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DEPARTMENTAL RESEARCH UPDATES MARCH 2017

Li, J.; Sang, H.; Guo, H.; Jung, G.; **Mukherjee, A.**; **White, J.C.**; Xing, B. 2017. Antifungal mechanisms of ZnO and Ag nanoparticles to *Sclerotinia homeocarpa*. *Nanotechnol.* 28:15.

Abstract: Fungicides have previously been used to effectively combat fungal diseases on a range of plant species, but resistance to multiple active ingredients has developed in pathogens such as *Sclerotinia homoeocarpa*, the causal agent of dollar spot on cool season turf. Recently, ZnO and Ag nanoparticles (NPs) have received increased attention due to their antimicrobial activities. In this study, the NPs' toxicity and mechanisms of action were investigated as alternative antifungal agents against *S. Homoeocarpa* strains that varied in their resistance to a conventional demethylation inhibitor (DMI) fungicide. The mycelial growth of *S. homoeocarpa* isolates regardless of their DMI sensitivity was significantly inhibited in ZnO NPs, Ag NPs, ZnCl₂ (Zn⁺ ions) and AgNO₃ (Ag⁺ ions) amended media. Two ROS response genes, glutathione S-transferase (Shgst1) and superoxide dismutase 2 (ShSOD2), were upregulated in *S. homoeocarpa* isolates by exposure to the NPs and ions. In addition, an increase in the nucleic acid contents of fungal hyphae was observed upon treatment with Ag NPs using Raman spectroscopy. We further found that a zinc transporter (Shzrt1) played an important role in accumulating ZnO and Ag NPs into the fungal cells. The expression of Shzrt1 in *S. homoeocarpa* was significantly induced by ZnO or Ag NPs within 3h of exposure. Yeast mutants overexpressing Shzrt1 exhibited increased sensitivity to ZnO and Ag NPs, as well as Zn⁺ and Ag⁺ ions. Moreover, overexpression of Shzrt1 in the yeast resulted in increased Zn or Ag content after exposure. This is the first report of involvement of the zinc transporter in the accumulation of ZnO and AgNPs in filamentous plant pathogenic fungi. Understanding the molecular mechanisms of NPs' antifungal activities will be useful in developing effective management strategies to control important pathogenic fungal diseases.

Eevers, N.; **White, J.C.**; Weyens, N.; Vangronsveld, J. 2017. Bio- and phytoremediation of pesticide contaminated environments: A review. *Adv. Botan. Sci.* <http://dx.doi.org/10.1016/bs.abr.2017.01.001>.

Abstract: Pesticide-contaminated fields can be found worldwide due to excessive use of insecticides, herbicides and fungicides. Many of the pesticides that were once used intensively are now forbidden and have been shown to have deleterious health effects. Plants, bacteria and fungi have been shown to possess pesticide-degrading capacities, which can be applied in the successful remediation of contaminated fields and water. This article will first provide an overview of the different types of pesticides, their application and their key characteristics, followed by an analysis of their behaviour in the environment. Pesticides that are introduced into the environment seldom stay where they were applied. A complex system of transport, transfer and transformation of pesticides throughout different environmental compartments often takes place. These processes all influence the possible remediation of the pesticide-contaminated media. We will then review several possible remediation strategies that are currently available. Bioremediation is the first technology that is reviewed. With bioremediation, the focus is on the remediation of pesticides by microorganisms in bulk soil, without the aid or presence of plants. Second, plant-associated remediation is discussed. When focussing on plant-associated remediation, a distinction has to be made between rhizoremediation in the rhizosphere and phytoremediation within the plant tissues. While rhizoremediation and phytoremediation processes are possible solely with the use of plants, many of these processes are optimized by associations between plants and microorganisms. Plants and bacteria or fungi often live in a symbiotic relationship that aids them in surviving contaminated environments, as well as with the degradation of the contaminants they encounter. In the last part of the

review, we discuss the advantages and disadvantages of “natural” remediation strategies as compared to more classical industrial approaches.

Cahill, M. E., Yao, Y., Nock, D., **Armstrong, P. M., Andreadis, T. G.**, Diuk-Wasser, M. A., and Montgomery, R. R. 2017. West Nile virus seroprevalence, Connecticut, USA, 2000–2014 *Emerging Inf. Dis.* 23: 708-710. <http://dx.doi.org/10.3201/eid2304.161669>.

Abstract: Since the 1999 emergence of West Nile virus (WNV) in North America, >43,000 cases of disease and 1,884 deaths have been reported. Overall infections are estimated at ≈ 3 million. Although WNV infections can be asymptomatic, they can also cause severe neuroinvasive disease, especially among infants, immunocompromised persons, and elderly persons. Control of WNV infection involves innate immune pathways that mediate initial recognition and regulation of viral replication and adaptive immune responses that provide long-term protection. Spatial distribution analysis and mosquito surveillance studies have confirmed that WNV is endemic to Connecticut. We compared seroprevalence and demographics for 890 nonimmunosuppressed and 173 immunosuppressed adults enrolled in a study on immunity in aging with those of symptomatic WNV case-patients reported to the Connecticut Department of Health (DPH) during 2000–2014. We detected WNV seroconversion in 8.5% of nonimmunosuppressed and 16.8% of immunosuppressed persons. Among nonimmunosuppressed asymptomatic participants, age was not a significant factor with regard to WNV seroconversion. However, mean age of symptomatic case-patients was older than that of asymptomatic seropositive participants, indicating that age remains a factor in disease susceptibility. The higher WNV seroprevalence among immunosuppressed adults strongly suggests a key role for immune factors in seroconversion.

Steven, Blaire*, Hesse, Cedar, **Soghigian, John**, La Verne Gallegos-Graves Dunbar, John*, Simulated Ribosomal RNA: DNA Ratios Show Potential to Misclassify Active Populations as Dormant *Applied and Environmental Microbiology* : *Applied and Environmental Microbiology*. 00696-17 (<http://aem.asm.org/content/early/2017/03/27/AEM.00696-17.full.pdf+html>)

Abstract: The use of ribosomal RNA:DNA ratios derived from surveys of rRNA sequences in RNA and DNA extracts is an appealing but poorly validated approach to infer the activity status of environmental microbes. To improve interpretation of rRNA:DNA ratios, we performed simulations to investigate the effect of community structure, rRNA amplification, and sampling depth on the accuracy of rRNA:DNA ratios in classifying bacterial populations as “active” or “dormant”. Community structure was an insignificant factor. In contrast, the extent of rRNA amplification that occurs as cells transition from dormant to growing had a significant effect ($p < 0.0001$) on classification accuracy, with misclassification error ranging from 16 to 28% depending on the rRNA amplification model. Error increased to 47% when communities included a mixture of rRNA amplification models, but most of the inflated error was false negatives (i.e., active populations misclassified as dormant). Sampling depth also affected error rates ($p < 0.001$). Inadequate sampling depth produced various artifacts that are characteristic of rRNA:DNA ratios generated from real communities. These data show important constraints on use of rRNA:DNA ratios to infer activity status. Whereas classification of populations as “active” based on rRNA:DNA ratios appears generally valid, classification of populations as “dormant” is potentially far less accurate.

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DR. WADE ELMER and the undergraduate students, graduate students, and staff of the Division of Plant Pathology at Chiang Mai University, Chiang Mai, Thailand.



JOURNAL ARTICLES APPROVED MARCH 2017

Cowles, Richard S. and Brian D. Eitzer. Residues of neonicotinoid insecticides in pollen and nectar from model plants. *Journal of Environmental Horticulture*

Dingman, Douglas W. Four more complete genomes of *Paenibacillus larvae*. *Genome Announcements*

LaMondia, James A. Connecticut Agricultural Experiment Station blue mold update (revised over the season as conditions change). www.ctvalleytobacco.org

LaMondia, James A. and Katja Maurer. *Calonectria pseudonaviculata* microscleerotia viability after exposure to fungicides. *Phytopathology* (abstract)

Li, DeWei. Indoor molds and their management. *CAES Fact Sheet* (revised 2017)

McNally, R. R., **Quan Zeng**, and G. W. Sundin. HrcU and HrpP are pathogenicity factors in the fire blight pathogen *Erwinia amylovora* required for the type III secretion of DspA/E. *BMC Microbiology*

Pignatello, Joseph J., W. A. Mitch, and W. Xu. Activity and reactivity of pyrogenic carbonaceous matter toward organic compounds. *Environmental Science & Technology*

Schultes, Neil P., B. Murtishi, and **De-Wei Li**. Phylogenetic relationships of Chlamydomyces, *Harzia*, *Olpitrichum* and their sexual allies, *Melanospora* and *Sphaerodes*. *Fungal Biology*

Slack, S., **Quan Zeng**, C. Outwater, and G. W. Sundin. Microbiological examination of *Erwinia amylovora* exopolysaccharide ooze. *Phytopathology*

Sundin, G. W., L. F. Castiblanco, X. Yuan, **Quan Zeng**, and C. H. Yang. Bacterial disease management: challenges, experience, innovation and future prospects. *Molecular Plant Pathology*

Yang, J., **Joseph J. Pignatello**, B. Pan, and B. Xing. Degradation of p-nitrophenol by lignin and cellulose chars: H₂O₂-mediated reaction and direct reaction with the solid. *Environmental Science & Technology*

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GRANTS RECEIVED MARCH 2017

DR. JATINDER S. AULAKH received a \$10,000 grant for IR-4 Research Trials.



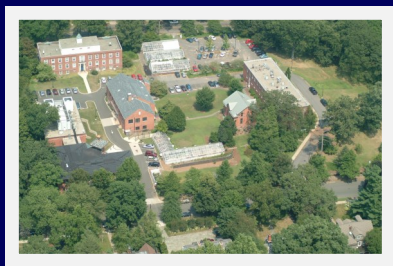
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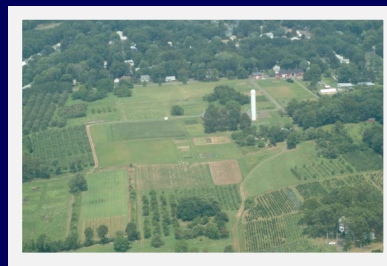
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123 Huntington Street
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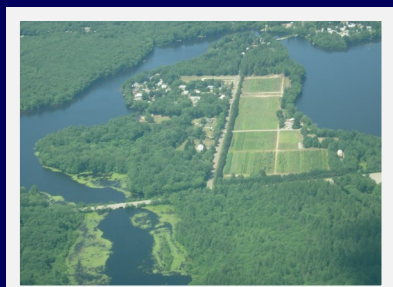
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Valley Laboratory, Windsor

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Volume 7 Issue 4
April 2017

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