

# Station News

The Connecticut Agricultural Experiment Station  
Volume 8 Issue 11 November 2018



## 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.



# CAES

The Connecticut Agricultural Experiment Station

*Putting Science to Work for Society since 1875*

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## ADMINISTRATION

**DR. THEODORE ANDREADIS** participated in a joint meeting of State Agricultural Experiment Station Directors and Association of Research Directors held in Lincoln, NE (October 1-3); presented comments on the greatest challenge that should be addressed through NIFA's research, education, and extension programs, the most-needed breakthrough in science/technology that would advance the state's agricultural enterprise, and top priorities in food and agricultural research, extension, or education that NIFA should address at a listening session sponsored by the USDA National Institute of Food and Agriculture held in Hartford (October 11); and presided over a quarterly meeting of the Station's Board of Control held at the Valley Laboratory in Windsor (October 17).

## ANALYTICAL CHEMISTRY

**DR. JASON C. WHITE** attended the 15th International Phytotechnologies Conference in Novi Sad, Serbia and gave a presentation entitled "Use of Engineered Nanomaterials to Suppress Crop Disease in Plants," chaired a technical session entitled "Plant-Nanoparticle Interactions," and chaired a meeting of the Editorial Board of the *International Journal of Phytoremediation* (October 1-5); participated in an "All Faculty" strategic planning call for the Center for Sustainable Nanotechnology (October 8); chaired a technical session at the "2nd Quantifying Exposure to Engineered Nanomaterials from Manufactured Products (QEEN II)" Workshop at the US Department of Labor in Washington, DC and gave a presentation entitled "Exposure to Nanomaterials in Agroecosystems and Agricultural Production" (140 attendees) (October 9-10); along with **DR. BRIAN EITZER, MS. TERRI ARSENAULT, MR. CRAIG MUSANTE, DR. CHRISTINA ROBB,** and **DR. WALTER KROL,** participated in the monthly FDA FERN cCAP teleconference call (October 11); gave a lecture entitled "Engineered Nanomaterials for the Control of Plant Pathogens" at Zhejiang University in Hangzhou, China (100 attendees) (October 17) and at the Research Institute for Subtropical Forestry of the Chinese Academy of Forestry in Hangzhou China (20 attendees) (October 18); along with **MS. KITTY PRAPAYOTIN-RIVEROS,** participated in the year 4 kick-off call for the FDA AFRPS grant (October 22); spoke by phone with Professor Juan Pablo Giraldo of the University of California Riverside about collaborative experiments within the Center for Sustainable Nanotechnology (October 23); attended CHRO Workplace Discrimination Investigations training at the Legislative Office Building in Hartford (October 24); participated in the AFRPS Face-to-Face Annual Meeting Planning Committee call (October 25); was interviewed by phone by Ms. Mallory Hinks (AAAS Fellow) of the National Nanotechnology Initiative Program Office about my views on what the scientific community has learned about nanotechnology over the last 15 years (October 25); participated in an FDA Partnership for Food Protection (PFP) teleconference call on submission of state data to the FDA (October 29); along with **DR. THEODORE ANDREADIS** and **DR. WASHINGTON DA SILVA,** visited the Department of Public Health Laboratory in Rocky Hill for a demonstration of their electron microscopy system (October 30); and along with **DR. ROBERTO DE LA TORRE ROCHE,** spoke by phone with collaborators at the Harvard School of Public Health regarding collaborative experiments (October 31).

**DR. CHRISTINA ROBB** attended a board meeting of the Eastern Analytical Symposium in Plainsboro, NJ (October 29).

**NUBIA ZUVERZA-MENA** gave a presentation entitled "Emerging contaminants: Per- and polyfluoroalkyl substances" at the University of Texas at El Paso (15 attendees) (October 29).

**DR. ROBERTO DE LA TORRE-ROCHE** attended the 15th International Phytotechnologies Conference at Novi Sad, Serbia and gave a presentation entitled "Co-exposure of Imidacloprid and Weathered or Unweathered Silver Nanoparticles to *Cucurbita pepo* (Zucchini): Contaminant Bioaccumulation and Translocation" (30 attendees) (October 1-5).



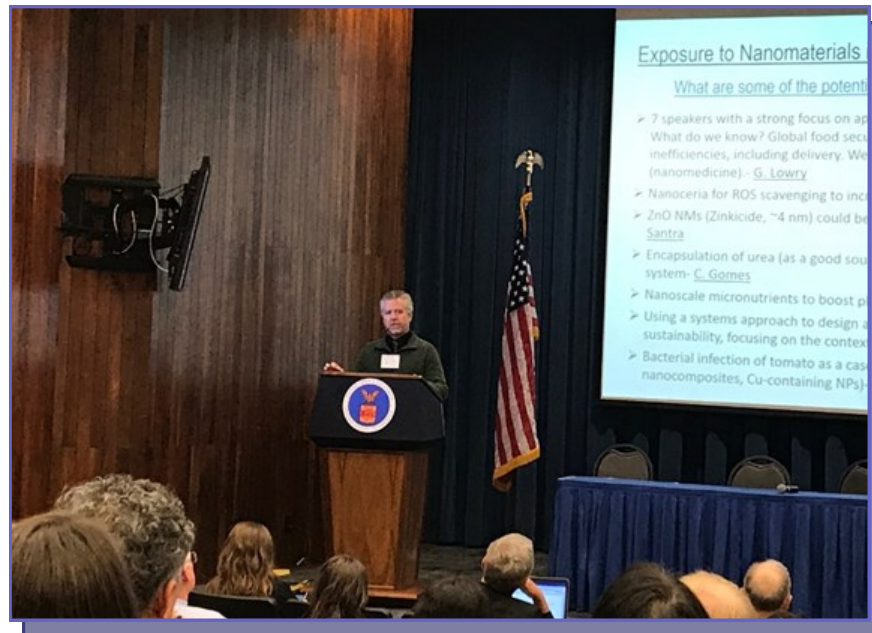
Dr. Jason C. White lecturing at Zhejiang University in Hangzhou China.



Dr. Jason C. White with collaborators at the Research Institute for Subtropical Forestry of the Chinese Academy of Sciences.



Dr. Jason C. White, Dr. Wade Elmer and Dr. Juan Pablo Giraldo (UC Riverside) at the US Department of Labor in Washington DC attending the 2<sup>nd</sup> Quantifying Exposure to Engineered Nanomaterials from Manufactured Products (QEEN II) Workshop.



Dr. Jason C. White lecturing at the US Department of Labor.

## ENTOMOLOGY

**DR. KIRBY C. STAFFORD III** was interviewed by Azubuiki Ejiochi, Fox 61 News, about the Asian longhorned tick (October 1); presented a tick update at a meeting of the Ledge Light Health District Lyme Disease Prevention Task Force (8 attendees) (October 11); spoke on ticks and tick-borne diseases at the Vernon Garden Club in Vernon (30 attendees) (October 15); with **DR. GALE RIDGE**, spoke on “Entomology and Death” at the State Police Academy in Meriden (38 attendees) (October 16); interviewed by John Silva, WTIC-radio, about spotted lanternfly; visited by Isabell MacInnes, a health protection and screening nurse specialist from NHS Western Isles, Scotland (October 24); with **DR. GALE RIDGE**, presented two

talks to the students of Alice Bray, Central Connecticut State University on ticks, bed bugs, and forensic entomology (14 attendees) (October 25); was interviewed by John Burgeson, Connecticut Post, about the spotted lanternfly (October 29); and attended the 30th Annual Conference on Urban and Community Forestry in Plantsville (October 31).

**MS. TIA BLEVINS** participated in the 2018 HIS-Eastern Chapter's Interstate Inspection held in Reading, PA, discussing Pennsylvania's spotted lanternfly compliance agreements and issues dealing with importing products from PA. The group reviewed the process for allowing permitting via SANC (Systems Approach to Nursery Certification) program. Attendees also visited two locations to witness spotted lanternfly outbreaks which included adult and egg mass life stages (35 participants) (October 22-24).

**MR. MARK H. CREIGHTON** attended a meeting with students and staff at The Sound School in New Haven, performing inspections and getting the honey bees ready for winter (12 student attendees) (October 10); and attended the graduation ceremony in Jones Auditorium for students in the Yale Study Group Program for emotionally challenged students, using honeybees for therapy. Parents and instructors viewed a video of the student's progress through the program and light refreshments were provided (30 attendees) (October 27).

**MS. MEGAN LINSKE** participated in the Northeast Section of the Wildlife Society (NETWS) conference call to plan the Fall Executive Committee Meeting at the Wildlife Society Conference in Cleveland, OH (October 5); participated in the Wildlife Society's Sections and Chapters collaboration meeting (October 9); became chair of the NETWS Workshop Committee (October 10); participated in the NETWS Fall Executive Committee meeting as Section Secretary and Workshop Chairperson (October 10); graduated from the National Wildlife Society Leadership Institute (October 11); participated in a collaborative meeting with members of the University of Connecticut's Natural Resources department on future research collaboration and funding opportunities (October 17); attended the Northeast Regional Center of Excellence in Vector-Borne Disease's trainee seminar (October 23); and hosted Isabelle Mac Innes during her Churchill Fellowship by providing a tour of CAES and a demonstration of our tick sampling methodology in Lyme (October 24-25).

**DR. CHRIS T. MAIER** exhibited new entomological books at a meeting of the Connecticut Entomological Society held at the University of Connecticut, Storrs (October 19).

**DR. GALE E. RIDGE** presented a talk about bed bugs in libraries at the main library, New Haven (39 attendees) (October 2); presented a talk about economically important exotic arthropod pests of plants and humans to the Woodbridge Garden Club in North Haven (23 attendees) (October 23); and with **DR. KIRBY STAFFORD**, presented two talks to the students of Alice Bray, Central Connecticut State University, on ticks, bed bugs, and forensic entomology (14 attendees) (October 25).

**DR. CLAIRE E. RUTLEDGE** participated in and presented a talk entitled "Trapping the bronze birch borer" at the conference "Preparing Europe for invasion by the emerald ash borer and the bronze birch borer" sponsored by the Organization for Economic Cooperation and Development (OECD) and held at the Austrian Research Centre for Forests (BFW) in Vienna, Austria (50 attendees) (October 1-4); participated as an "expert"

in the “14th Meeting of the Working Group on EU Priority Pests - EKE on *Agrilus anxius* and *Agrilus planipennis*,” Vienna, Austria (8 adult attendees) (October 5-6); taught the lecture and laboratory sections on “Insect Pests of Trees” for Arboriculture 101 at The Connecticut Tree Protective Association, Wallingford (45 adults) (October 17 and October 24); and presented “Dr. Rutledge’s Insectorium and Petting Zoo” at the Ghouls & Gourds Festival at the Brooklyn Botanic Garden (approx. 500 youths) (October 27).

**DR. KIMBERLY A. STONER** spoke about “Planting for the Bees’ Needs” and led a walk around the garden to talk about the bees we observed at the Yale Marsh Botanical Garden in New Haven (35 attendees) (October 4); led a meeting of the Connecticut Native Plants for Pollinators and Wildlife Working Group at Highstead Arboretum in Redding (12 attendees) (October 15); and made a presentation entitled “Planting for the Bees’ Needs” at the annual meeting of the Clinton Land Trust, at the public library in Clinton (50 attendees) (October 15).



Pictures of attendees at the Brooklyn Botanic Garden with Madagascar Hissing Cockroach (L) and tobacco hornworm (R).



Vienna Group

## ENVIRONMENTAL SCIENCES

**DR. JOSEPH PIGNATELLO** participated in a meeting of Council of the Connecticut Academy of Science and Engineering in Wethersfield (October 24).

**DR. PHILIP ARMSTRONG** gave a lecture for the pre-meeting course "Vector-Borne Disease Risk and Prevention for the Clinician" (35 attendees), chaired the American Committee of Medical Entomology Council Meeting (12 attendees), and chaired two symposia on medical entomology (50 attendees) at the Annual Meeting of the American Society of Tropical Medicine & Hygiene held in New Orleans, LA (October 27-31); and was interviewed by News Channel 3 (October 1) and WTIC (October 3) about the detection of EEE virus in mosquitoes in eastern Connecticut.

**MR. GREGORY BUGBEE**, with **MS. SUMMER STEBBINS** presented a poster entitled "Surveillance and Management of Invasive Aquatic Plants" at the biannual meeting of the Connecticut Invasive Plant Working Group held at the University of Connecticut in Storrs (approx. 200 attendees) (October 4); spoke at the annual meeting of the Crystal Lake Association on "New Methods of Aquatic Weed Management" at the Town Hall in Ellington (approx. 50 attendees) (October 4); and spoke at the annual meeting of the Lower Bolton Lake Association on "The CAES IAPP 2018 Aquatic Plant Survey of Lower Bolton Lake" in Manchester (approx. 75 attendees) (October 22).

**DR. ANDREA GLORIA-SORIA** gave a lecture entitled "Historical and Modern Movements of the Yellow Fever Mosquito, *Aedes aegypti*." to the Mystic Aquarium staff (15 attendees) (October 17).

**DR. GOUDARZ MOLAEI** was interviewed about the first East Asian longhorned tick found in the state by the Connecticut Post (<https://www.ctpost.com/local/article/First-person-bitten-by-east-Asian-longhorned-tick-13271684.php>), WTIC NewsTalk 1080 (<https://wtic.radio.com/articles/caes-first-signs-exotic-tick-ct>), WFSB, Eyewitness News 3 ([https://www.wfsb.com/news/evidence-of-bite-by-exotic-tick-reported-in-connecticut/article\\_354dcb36-c585-11e8-ad18-475842722d17.html](https://www.wfsb.com/news/evidence-of-bite-by-exotic-tick-reported-in-connecticut/article_354dcb36-c585-11e8-ad18-475842722d17.html)), Fox 61 (<https://fox61.com/2018/10/01/evidence-of-bite-by-exotic-east-asian-tick-reported-in-connecticut/>), Daily Voice Newtown (<https://newtown.dailyvoice.com/news/first-bite-victim-of-asian-longhorned-tick-reported-in-fairfield-county/742673/>), News 12 (<http://connecticut.news12.com/clip/14644334/officials-new-tick-species-spotted-in-fairfield-county>), WTIC-AM, The Newtown Bee, and WTNH Channel 8 (<https://www.wtnh.com/news/health/uconn-research-scientists-issue-warning-on-rare-tick/1536790794>) (October 1, 2, 3, 12, 19); gave the invited talk "*The Enduring Challenge and Future Outlook of Tick-borne Diseases*" to the Yale University School of Medicine (50 attendees) (October 10); gave the invited talk "*Nature's Revenge: Plague of Emerging Vector-borne Diseases in the 21 Century*" to the Biology Department, Central Connecticut State University (6 faculty and 14 student attendees) (October 16); and hosted Isabella Mac Innes, a Churchill Fellowship Awardee from the Health Protection and Screening Services, NHS Western Isles, Scotland, in the Tick Testing Laboratory (October 24).

**DR. BLAIRE STEVEN** and **DR. DOUG BRACKNEY** hosted the 7th Annual Symbiosis Symposium held in Jones Auditorium (54 attendees) (October 4).

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STATION NEWS

**DR. BLAIRE STEVEN** gave an invited lecture entitled "Desert Biological Soil Crusts as a Model for Soil Carbon Cycling" at Eastern Connecticut State University, Department of Biology (10 faculty and 30 student attendees) (October 9).

**DR. JOSEPHINE HYDE** gave an invited talk entitled "The Axenic Mosquito to Study Host Microbiome Interactions" at the 7th Annual Symbiosis Symposium held in Jones Auditorium (54 attendees) (October 4).

## FORESTRY AND HORTICULTURE

**DR. JEFFREY S. WARD** spoke on "Safety Concerns When Treating Invasive Species" at the Connecticut Invasive Plant Symposium held in Storrs (136 attendees) (October 4); was interviewed about the status of ash in Connecticut's forest by John Burgeson of the Connecticut Post (October 15); presented a workshop entitled "An Introduction to Tree Identification" for the Institute for Learning in Retirement at Albertus Magnus College in New Haven (37 attendees) (October 19); spoke on "The Biodiversity Crises" at the Greenwich Grown luncheon (54 attendees) (October 20); gave instruction on invasive plant control at Partners 4 Plants Weed Wrangle at Babcock Park in Greenwich (7 attendees) (October 20); spoke on "The Ever Changing Connecticut Forest" at the Cheshire Public Library (18 attendees) (October 22); and was interviewed about acorns and weather by Robert Miller of the Danbury News-Times (October 30).

**DR. ABIGAIL A. MAYNARD** spoke on "Composting and Utilization of Compost" to a Sustainability class at Hamden Hall Country Day School (30 students, 2 teachers) (October 11); gave a tour of Lockwood Farm to the kindergarten class from Hamden Hall Country Day School (18 students, 2 teachers) (October 27); spoke on "Composting and Utilization of Compost" to the Trumbull Garden Club (72 adults) (October 22); and visited the composting operation at Wesleyan University in Middletown and gave advice on food waste composting (3 students, 1 teacher) (October 29).

**DR. SCOTT C. WILLIAMS** participated in a conference call of the Editorial Advisory Board for The Wildlife Professional (October 4); along with **MR. JOSEPH P. BARSKY** and **MR. MICHAEL R. SHORT**, attended the Connecticut Invasive Plant Symposium in Storrs (October 4); participated in the Northeast Section of the Wildlife Society (NETWS) conference call to plan the Fall Executive Committee Meeting at the National Wildlife Society Conference (October 5); attended the National Wildlife Society Conference in Cleveland, OH and as President-Elect, participated in the NETWS Fall Executive Committee meeting, the Wildlife Society Sections and Chapters Collaboration Meeting, and the meeting of the Editorial Advisory Board for the Wildlife Professional in Cleveland, OH (October 6-11); participated in a conference call planning the 75th Annual Northeast Fish and Wildlife Conference (October 12); gave an invited lecture about environmental employment opportunities at Middlesex Community College in Middletown (20 students, 1 teacher) (October 24); hosted Scotland resident Isabelle MacInnes during her Churchill Fellowship by providing a tour of CAES and a demonstration of tick sampling methodology in Lyme (October 24-25).



## PLANT PATHOLOGY AND ECOLOGY

**DR. WADE ELMER** was invited to the 2nd Quantifying Exposure to Engineered Nanomaterials from Manufactured Products Workshop in Washington, DC and gave a presentation entitled “Metalloid and Metal Oxides for Plant Disease Control” (22 adults) (October 9).

**DR. YONGHAO LI** presented “Backyard Small Fruit 101” to Morris Cove Garden Club members in New Haven (15 adults) (October 10); instructed the tree disease section of the Tree Conditions Lab for the CTPA Arboriculture 101 Training Program (36 adults) (October 24); and talked about the PDIO and plant disease diagnosis to Southern Connecticut States University students and faculty in Dr. Elizabeth Roberts’ Mycology class in New Haven (15 adults) (October 30).

**DR. QUAN ZENG** served on a grant panel of Génome Québec and participated in a virtual panel discussion (October 1-3); and attended the the 80th Annual New England, New York and Canadian Fruit Pest Management Workshop in Burlington, Vermont and gave two research presentations entitled “Apple Flower Microbiome and its Impact on Fire Blight Infection,” and “Understanding the Role of Water in Blossom Blight Infection” (50 adults) (October 23-24).

## VALLEY LABORATORY

**DR. JATINDER S. AULAKH** attended the 2018 CIPWG symposium, organized an invasive plants display and staffed the CAES display booth in Storrs (October 4); and talked with Dr. Karl Guillard and Branden Noons, weed ecologist and graduate student, respectively, at UCONN (October 22) about a collaborative research project on screening suspected herbicide-resistant weeds in CT.

**DR. CAROLE CHEAH** met with Beverly Samuel, USDA NIFA National Program Leader, at Lockwood Farm, to give an update on research on biological control of hemlock woolly adelgid (September 19); attended and presented a poster on “Biological control of Mile-a-minute Weed in CT” and assisted at the CAES display at the 2018 CIPWG Symposium on Invasive Plants held at the University of Connecticut in Storrs (October 4); and presented an evening lecture on invasive hemlock woolly adelgid and mile-a-minute weed as the inaugural fall lecture of the Edgerton Conservancy Garden Lecture series, Edgerton Park Carriage House, New Haven (12 attendees) (October 11).

**DR. RICHARD COWLES** presented “Adapting our landscapes for climate change” for the East Windsor Garden Club, Broad Brook (20 attendees) (October 16); and presented a lecture “The queen of your dreams” for Bio 388 (Biology of Bees and Pollinator Ecology, 15 attendees) followed by a modified talk with the same title to Master Gardeners at the University of Rhode Island (35 attendees) (October 25).

**MS. ROSE HISKES**, with **DR. YONGHAO LI**, reviewed tree diseases with Arboriculture 101 students in Wallingford (39 students) (October 24).

**DR. JAMES LAMONDIA** participated in the CT Hop Growers Association Brewer Hop Lot Day held in Northford (12 attendees) (October 4); taught a class on identification, biology and management of tree diseases to students in the Connecticut Tree Protective Association's Arboriculture 101 class in Wallingford (40 attendees) (October 10); spoke about the Hops research program at the Station at the Board of Control meeting held at the Valley Laboratory in Windsor (October 17); and spoke about nematode management research results at the annual meeting of the Northeast Regional Multistate Nematology Technical Committee (NE-1640) held in Northampton, MA (15 attendees) (October 24-26).

**DR. DEWEI LI** attended the MASSMyco meeting held at Harvard University and presented a poster entitled "*Phytophthora abietivora*, a New Species Isolated from Diseased Christmas trees in Connecticut, USA" coauthored with Drs. James A. LaMondia, Richard S. Cowles and Neil P. Schultes (October 20).

## DEPARTMENTAL RESEARCH UPDATES OCTOBER 2018

Correa, M.A.; Matusovsky, B.; Brackney, D.E.; Steven, B. "Generation of axenic *Aedes aegypti* demonstrate live bacteria are not required for mosquito development" *Nature Communications*. 10.1038/s41467-018-07014-2

Abstract- The mosquito gut microbiome plays an important role in mosquito development and fitness, providing a promising avenue for novel mosquito control strategies. Here we present a method for rearing axenic (bacteria free) *Aedes aegypti* mosquitoes, consisting of feeding sterilized larvae on agar plugs containing a high concentration of liver and yeast extract. This approach allows for the complete development to adulthood while maintaining sterility; however, axenic mosquito's exhibit delayed development time and stunted growth in comparison to their bacterially colonized cohorts. These data challenge the notion that live microorganisms are required for mosquito development, and suggest that the microbiota's main role is nutritional. Furthermore, we colonize axenic mosquitoes with simplified microbial communities ranging from a single bacterial species to a three-member community, demonstrating the ability to control the composition of the microbiota. This axenic system will allow the systematic manipulation of the mosquito microbiome for a deeper understanding of microbiota-host interactions.

Li, D.; Zhao, G. 2018. *Ascotricha microspora* sp. nov. from Cayman Islands. *Mycotaxon* 133: 219-228.

Abstract- A new hyphomycete species, *Ascotricha microspora* collected from Cayman Islands in the Caribbean, is described and illustrated. The asexual fungus differs from *Dicyma vesiculifera* by having smaller, colorless conidia. *Ascotricha rugispora* ( $\equiv$  *Surculiseria rugispora*) and *A. funiculosa* ( $\equiv$  *Dicyma funiculosa*) are proposed as new combinations.

Pagano, L.; Maestri, E.; White, J.C.; Marmiroli, N.; Marmiroli, M. 2018. Quantum dots exposure in plants: Minimizing the adverse response *Curr. Op. Environ. Sci. Health* doi.org/10.1016/j.coesh.2018.09.001.

**Abstract-** Quantum dots (QDs) are being widely used for a range of new applications in chemistry, biology, medicine and agrifood. The rapid increase in annual usage-rate of QDs has raised concerns over their environmental dispersal, as well as for impacts on human and environmental health and safety. Consequently, a full understanding of the molecular pathways and genetic mechanisms influenced by QDs in terrestrial plants is necessary. Innovative nanotoxicological strategies such as transcriptomics and proteomics are producing useful data for QDs risk assessment. The application of toxicogenomic strategies based on molecular biomarkers of exposure/effect in plants including food crops is among the most promising applications of this strategy.

Powell, JR.; Gloria-Soria, A.; Kotsakiozi, P. Recent History of *Aedes aegypti*: Vector genomics and epidemiology records. *BioScience*, *biy119*, <https://doi.org/10.1093/biosci/biy119>. Published online October 31, 2018.

**Abstract-** *Aedes aegypti* bears the common name “the yellow fever mosquito,” although, today, it is of more concern as the major vector of dengue, chikungunya, and, most recently, Zika viruses. In the present article, we review recent work on the population genetics of this mosquito in efforts to reconstruct its recent (approximately 600 years) history and relate these findings to epidemiological records of occurrences of diseases transmitted by this species. The two sources of information are remarkably congruent. *Ae. aegypti* was introduced to the New World 400-550 years ago from its ancestral home in West Africa via European slave trade. Ships from the New World returning to their European ports of origin introduced the species to the Mediterranean region around 1800, where it became established until about 1950. The Suez Canal opened in 1869 and *Ae. aegypti* was introduced into Asia by the 1870s, then on to Australia (1887) and the South Pacific (1904).

Blaire, S.; Belnap, J.; Kuske, C.R. "Chronic Physical Disturbance Substantially Alters the Response of Biological Soil Crusts to a Wetting Pulse, as Characterized by Metatranscriptomic Sequencing." *Frontiers in Microbiology* 9 (2018).<https://doi.org/10.3389/fmicb.2018.02382>

**Abstract-** Biological soil crusts (biocrusts) are microbial communities that are a feature of arid surface soils worldwide. In drylands where precipitation is pulsed and ephemeral, the ability of biocrust microbiota to rapidly initiate metabolic activity is critical to their survival. Community gene expression was compared after a short duration (1 h) wetting pulse in both intact and soils disturbed by chronic foot trampling. Across the metatranscriptomes the majority of transcripts were cyanobacterial in origin, suggesting that cyanobacteria accounted for the bulk of the transcriptionally active cells. Chronic trampling substantially altered the functional profile of the metatranscriptomes, specifically resulting in a significant decrease in transcripts for nitrogen fixation. Soil depth (biocrust and below crust) was a relatively small factor in differentiating the metatranscriptomes, suggesting that the metabolically active bacteria were similar between shallow soil horizons. The dry samples were consistently enriched for hydrogenase genes, indicating that molecular hydrogen may serve as an energy source for the desiccated soil communities. The water pulse was associated with a restructuring of the metatranscriptome, particularly for the biocrusts. Biocrusts increased transcripts for photosynthesis and carbon fixation, suggesting a rapid resuscitation upon wetting. In contrast, the trampled surface soils showed a much smaller response to wetting, indicating that trampling altered the metabolic response of the community. Finally, several biogeochemical cycling genes in carbon and nitrogen cycling were assessed for their change in abundance due to wetting in the biocrusts. Different transcripts encoding the same gene product did not show a consensus response, with some more abundant

in dry or wet biocrusts, highlighting the challenges in relating transcript abundance to biogeochemical cycling rates. These observations demonstrate that metatranscriptome sequencing was able to distinguish alterations in the function of arid soil microbial communities at two varying temporal scales, a long-term ecosystems disturbance through foot trampling, and a short term wetting pulse. Thus, community metatranscriptomes have the potential to inform studies on the response and resilience of biocrusts to various environmental perturbations.

Zhu, Li-Hua, Xu, W.; Yang, J.; Li, D.\*; Ge, J.; Ye, J. 2018. First report of *Septotinia populiperda* causing leaf blotch of *Salix babylonica* in China. Plant Disease.

\*Corresponding authors <https://doi.org/10.1094/PDIS-05-18-0827-PDN>

**Abstract-** *Salix babylonica* L. is an important landscape tree in China. In Nov. 2016, *S. babylonica* with leaf blotch were collected from Shanghai, China. Symptoms began as small tan to brown lesions near the tip of leaves and later expanded proximally and stopped at the middle part of the leaves. The lesions enlarged rapidly and further developed into dry lesions with sporodochia. Symptomatic leaf tissues (3-4 mm<sup>2</sup>) were surface sterilized in 75% ethanol for 30s, 1% NaOCl for 90s, rinsed with sterile distilled H<sub>2</sub>O, and placed on potato dextrose agar and incubated at 25°C for 7 days. Pure cultures were obtained by monospore isolation. Three isolates were obtained and deposited at CCTCC (LS01: AF2018006, LS1-5-4: AF2018007, LS03: AF2018008). The isolates developed white-gray, scalloped margin, zonate colonies with radiating mycelia. The advancing edge of the colony soon showed a fanlike growth of mycelia. The morphological characters differed greatly among the strains. LS01 and LS03 formed abundant black sclerotia in ca. 10 days but no sporulation. LS1-5-4 sporulated after 10-14 days but sclerotia were rare. The fungus was asexual, dimorphic, amphigenous. Sporodochia are salmon in color, 98-388 μm in diam; conidiophores densely compact, hyaline. Conidiogenous cells were holoblastic, cylindrical, attenuated towards the apex, 9.3±1.1 × 3.9±0.5 μm. Conidia (CA) are hyaline, smooth, 0-3 septate with truncate apex and base. Most CA on leaves were 1 to 2 celled, oblong or artillery shell shaped; some were 3 to 4 celled, oblong and straight or slightly curved. One-celled CA are 13.6±1.8 × 6.5±0.8 μm; 2-celled CA 19.3±2.9 × 6.5±0.6 μm; 3-4-celled CA 28.8±3.2 × 6.8±0.8 μm. Synanamorph: CA are 1-celled, global, hyaline, smooth, 2.9±0.3 μm, developed on phialides, which are 6.8±1 × 2.7±0.4 μm. Its morphology fit *Septotinia populiperda* (Waterman and Cash 1950; Sutton 1980). The internal transcribed spacer (ITS) region and large subunit (LSU) gene were amplified with primers ITS1/ITS4 (White et al. 1990) and LR0R/LR05 (Schoch et al. 2009). Both ITS and LSU sequences were 100% identical to the ones of the two cultures of *S. populiperda* bought from CBS (Utrecht, The Netherlands) (CBS 339.53, CBS 374.64) by multiple sequence alignment with BioEditor (Yang et al., 2003). The sequences of CBS 318.37, CBS 339.53, CBS 374.64, LS01, LS03 and LS1-5-4 were submitted to GenBank [as MH101502 to MH101504, MG786831, MG786832 and MG572458, respectively (ITS); as MH101505 to MH101507, MG786833, MG786834 and MG572459, respectively (LSU)]. Based on the morphological and molecular data, all the isolates were identified as *S. populiperda* Waterman & E.K. Cash ex B. Sutton. To complete Koch's postulates, 20 detached and 20 intact healthy 12-wk-old leaves from 2-yr-old potted *S. babylonica* were inoculated with 10 μL CA suspension (10<sup>5</sup> CA/mL) by a point inoculation on upper leaf surface and plugs of mycelia of LS1-5-4, and control leaves were treated with sterilized H<sub>2</sub>O and agar plugs. All detached inoculated leaves were placed in plates on wet filter paper at 25°C. The seedlings were placed in a greenhouse at 25°C and 16 h photoperiod. The experiment was repeated 3 times. All detached and 70% intact leaves inoculated developed symptoms and sporodochia in 3-5 days. The symptoms of developing leaf necrosis were the same as those in the field while the controls were symptomless. The same fungus was reisolated. This is the first report of *S. populiperda* on *S. babylonica* in China and in the world and a severe disease in Shanghai.

## JOURNAL ARTICLES APPROVED OCTOBER 2018

Arango-Velez, Adriana, S. Chakraborty, K. Blascyk, M. T. Phan, **Joseph P. Barsky**, and W. El Kayal. Anatomical and chemical responses of eastern white pine (*Pinus strobus* L.) to blue-stain (*Ophiostoma minus*) inoculation. *Forests*

**Cheah, Carole**. Balsam wooly adelgid is back on our radar! Newsletter, Connecticut Christmas Tree Growers Association

Deng, R., Y. Zhu, J. Hou, **Jason C. White**, J. L. Gardea-Torresdey, and D. Lin. Antagonistic toxicity of carbon nanotubes and pentachlorophenol to *Escherichia coli*: Physiological and transcriptional response. *Environmental Science & Technology*

Kah, M., N. Tufenkji, and **Jason C. White**. Nano-enabled strategies to enhance crop nutrition and protection. *Nature Nanotechnology*

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## GRANTS RECEIVED OCTOBER 2018

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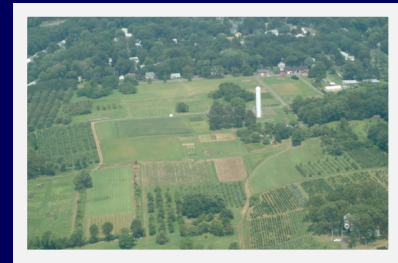
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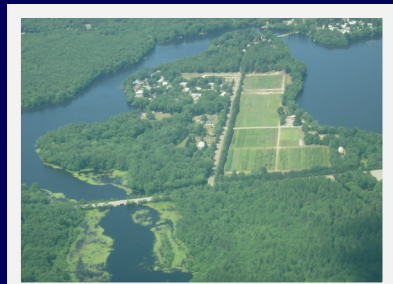
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