Station News

The Connecticut Agricultural Experiment Station
Volume 6 Issue 11 November 2016

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

ADMINISTRATION

DR. THEODORE ANDREADIS participated as a debater in a conference on the "Socioeconomic Contexts of Sustainable Agriculture," held at Western Connecticut State University in Danbury (October 14); presided over a quarterly meeting of the Station's Board of Control held at the Valley Laboratory in Windsor (October 19); hosted State Senators Beth Bye and Clark Chapin, Melissa Spear, Executive Director Common Ground, Jen Cushman, Hartford County 4-H Extension Educator, and CAES Board Member Terry Jones who visited the Station for a tour of the facilities (October 25); and participated in a meeting of Connecticut's Invasive Plant Council held in Hartford (October 26).

MS. VICKIE BOMBA-LEWANDOSKI attended FE3 (Facilitating Environmental Excellence) Project Food, Land, and People, Auer Farm, Bloomfield (October 14).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE attended the monthly CT Preparedness meeting at the Department of Public Health Laboratory in Rocky Hill (October 3); along with **DR. NUBIA ZUVERZA-MENA AND MS. KITTIPATH P.-RIVEROS** attended the AFPRS (Animal Feed Regulatory Program Standards) ISO CAP year 2 kick-off call with Dr. Ruiqing Pamboukian from the FDA ORA (October 4); participated in an Association of Public Health Laboratories (APHL)-sponsored call on nanotechnology (October 10); along with **DR. NUBIA ZUVERZA-MENA** met with regulatory staff from the CT Department of Agriculture to discuss collaborative work on the FDA AFRPS (October 12); along with **MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, DR. WALTER KROL, MR. CRAIG MUSANTE, MS. KITTIPATH P.-RIVEROS, DR. BRIAN EITZER, DR. CHRISTINA ROBB, MR. JOHN RANCIATO, AND MS. TERRI ARSENAULT** participated in the monthly FDA FERN cCAP teleconference call (October 13); along with **DR. NUBIA ZUVERZA-MENA, DR. LUCA PAGANO, AND DR. CHUANXIN MA,** attended a seminar by **DR. MARTA MARMIROLI** (visiting CAES for 5 weeks) at the University of Massachusetts in Amherst, MA on (October 14); was interviewed by Catherine Meyers of Inside Science (https://www.insidescience.org/) about a recent publication in *Environmental Pollution* that demonstrated that plants exposed to nanoparticle cerium oxide were more resistant to drought (October 17); attended the Ph.D. Dissertation Defense of Ms. Nele Eevers at Hasselt University in Hasselt Belgium (**DR. WHITE** was a Co-Promoter on her committee) (October 20-22); along with **MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, DR. WALTER KROL, MR. CRAIG MUSANTE, MS. KITTIPATH P.-RIVEROS, DR. BRIAN EITZER, DR. CHRISTINA ROBB, MR. JOHN RANCIATO, AND MS. TERRI ARSENAULT** hosted Dr. Susan Audino of the American Association for Laboratory Accreditation (A2LA) for an on-site assessment of our FDA funded Manufactured Food Regulatory Program (MFRPS) (October 24-25); gave a laboratory tour and description of department programs to State Senators Beth Bye and Clark Chapin (October 25); and was interviewed by Jan Spiegel of the CT Mirror concerning research on using nanoscale nutrients to suppress plant disease (October 27).

DR. BRIAN EITZER was a participant in the SCRI Pollinator Research conference call (October 12), the North American Chemical Residue Workshop's organizing committee phone conference (October 13), the FERN wide conference call (October 27) and the North American Chemical Residue Workshop's Social Events Committee call (October 31).

MS. KITTY PRAPAYOTIN-RIVEROS attended the educational webinar on how a testing laboratory meets their accreditation requirements and get extra time back in their day by Brenda Jackson from North Carolina Agriculture and Consumer Services (October 4).

ENTOMOLOGY

DR. KIRBY C. STAFFORD III was interviewed on film by Jennifer Reid, Ridgefield Blast Lyme Program, and Tanya Kory, Premise Health Wellness Program Manager, about tick biology and management for the development of training materials for Premise wellness directors (October 12); participated in a meeting at DEEP on control of gypsy moth (October 18); was visited by Dr. Husain Poonawaha, Microbiology Fellow at Yale (October 19); presented a talk on tick-borne diseases at the Annual Conference on Urban and Community Forestry in Plantsville (October 26); and presented a talk on tick-borne diseases and tick management at the Northeastern IPM Center Advisory Council Meeting in Baltimore, MD (28 attendees) (October 27).

MS. TIA M. BLEVINS attended the 2016 HIS Interstate Inspection held in Concord, NH. Participants visited a brand new, state of the art, hydroponic facility for edible baby greens and toured NH's largest wholesale nursery. The group also conducted a mock systems audit of the newest SANC Phase II pilot nursery (and current USCGCP participant). Presentations from associated organizations included a demonstration of NHBugs.org: How and why it works for NH; a visual presentation of NH upland invasive species; and a short talk about management of Japanese stiltgrass: the industry perspective (16 participants) (October 18-20).

MS. KATHERINE DUGAS attended and staffed a CAES/CCABB booth at the University of Bridgeport Health and Wellness Fair (October 27).

MR. MARK H. CREIGHTON attended a talk in Worchester MA by Wyatt Mangum PhD on overwintering beehives and using FAR images to monitor bee health during the winter and had a lunch meeting with Meghan Milbrath PhD who is the Coordinator of the Michigan Pollinator Initiative at Michigan State University (October 1); met with students from Common Ground High School at the East Rock Nature Center to evaluate/plan a future apiary site (October 6); and attended the Connecticut Beekeepers Association fall meeting at the Jones Auditorium in New Haven. Registration forms were collected and Mr. Creighton spoke to several beekeepers on bee health related issues (October 22).

DR. GALE E. RIDGE presented a talk to the New England Affordable Housing Management Association about bed bugs in Wallingford (October 6); with Attorney Judith R. Dicine, State Representative Larry B. Butler, and Dr. Ridge's daughter and son Heather and Timothy O'Connor, attended the official signing of the recently enacted law, "An Act Concerning the Rights and Responsibilities of Landlords and Tenants Regarding the Treatment of Bed Bug Infestations" in the Governor's Rooms, Capitol Building, Hartford (October 11); assisted the Connecticut Child Guidance Center draft a bed bug protocol document for staff (October 18); was interviewed by Eric Boodman, a journalist for STAT, a new national publication affiliated with the Boston Globe on Delusions of Parasitosis (October 20); and was interviewed by Channel 8 News about northern black widow spiders (October 24).

DR. CLAIRE E. RUTLEDGE taught the lecture and laboratory sections of "Insects and Mites that Attack Trees" for Arboriculture 101 put on by the Connecticut Tree Protective Association in Wallingford (35 attendees) (October 12 & 26); presented a lecture "Emerald Ash Borer in Connecticut" to the Advanced Master Gardeners in North Haven (8 attendees) (October 17); presented a lecture "Unwelcome Guests - The Management of Invasive Insects" at the annual conference of the Connecticut Urban Forest Council in Southbury (60 attendees) (October 26); and hosted the exhibit "Dr. Rutledge's Insectorium and Petting Zoo" at Ghouls & Gourds, Brooklyn Botanic Garden, Brooklyn, NY (festival attendance 12,000) (October 29).

DR. VICTORIA L. SMITH participated in a meeting of the US Forest Service Durham Field Office Forest Cooperators, held at the White Mountain National Forest Headquarters in Campton, NH (30 participants) (October 19-20).

DR. KIMBERLY A. STONER gave a talk at the annual meeting of the Connecticut Invasive Plant Working Group, "The Pollinator Victory Garden – The Bees" at the University of Connecticut in Storrs (100 attendees) (October 11) and met with the Connecticut Native Plant, Pollinator, and Wildlife Working Group to discuss ways to create both demand and supply of local native plant materials for planting in suitable environments around the state (9 attendees) (October 17).

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO was appointed to the Editorial Board of the journal *Molecules*.

DR. PHILIP ARMSTRONG gave the talk "Emergence of Deer-Associated Arboviruses: Jamestown Canyon and Cache Valley Virus" for the Epidemiology of Microbial Diseases Seminar Series at the Yale School of Public Health (approximately 100 attendees) (October 6); gave the talk "Zika Virus and Mosquitoes: Assessing the Risks" to the Yale Occupational Health Program (15 attendees) (October 18); and was interviewed by the CT Radio Network and WTIC about the mosquito trapping and testing program and its major findings during 2016 (October 31).

MR. GREGORY BUGBEE, with Jennifer Fanzutti, gave a demonstration on invasive aquatic plants at the Connecticut Invasive Plant Working Group conference at the University of Connecticut, Storrs (approximately 500 attendees) (October 11); and gave a talk in the CAES Seminar Series entitled "Invasive Aquatic Plants – The State of the State" (approximately 50 attendees) (October 19).

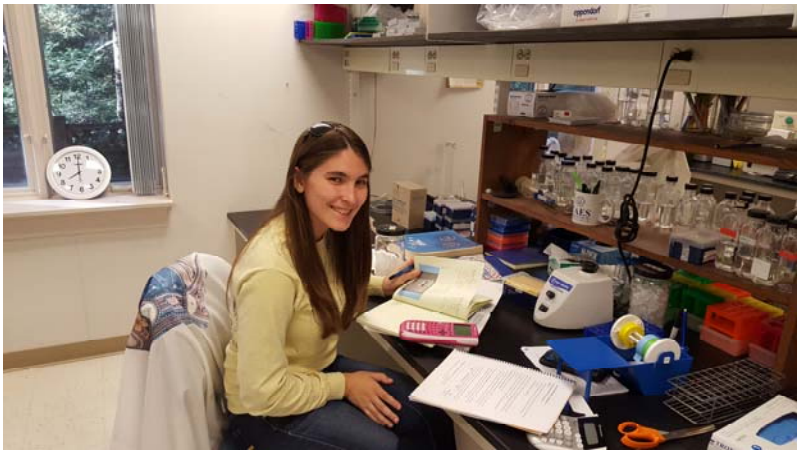
DR. JOHN SOGHIGIAN gave a talk "Evolution and Population Genetics of Mosquito Vectors" at the Yale School of Public Health's Epidemiology of Microbial Diseases Research Forum (15 attendees) (October 28).

MR. MICHAEL THOMAS co-instructed a lab-field trip to Archbold Biological Research Station in Venus, Florida, for the Yale University EEB Terrestrial Arthropod class (12 attendees) (October 19-23).

DR. CHARLES VOSSBRINCK presented a table display on figs and fig yield at the Natural Resource Conservation Fair in Derby (October 4).

BIOSKETCH OF MS. COURTNEY GORHAM

Courtney Gorham started working at the Station as a Connecticut DEEP Intern in September, 2016. She is a senior in the Forensics Science Program at the University of New Haven. She will be studying the changes in the bacterial communities in wetland sediments associated with sudden vegetation dieback under the supervision of Dr. Blaire Steven in the Department of Environmental Sciences. She will employ techniques in molecular biology from her studies to generate sequence libraries. Courtney can usually be found in the biochemistry laboratory.



FORESTRY AND HORTICULTURE

DR. JEFFREY S. WARD spoke on effects of invasive species and their control at the CIPWG and DEEP Wildlife fall tour in Litchfield (31 attendees) (October 1); along with **DR. SCOTT WILLIAMS**, **MR. JOSEPH P. BARSKY** and **MR. MICHAEL SHORT** and **MS. MEGAN LINSKE** staffed the CAES booth at the Southwest Conservation District's Natural Resource Conservation Fair at Lockwood Farm (200 students, 6 teachers) (October 4); was interviewed about gypsy moths and forest management by Judy Benson for the New London Day (October 6); gave invited talk "Biology and Control of Running Bamboo" at the CIPWG Invasive Plant Symposium in Storrs (150 attendees) (October 11); met with Steve Johnson, Milford Natural Resource Agent, to discuss control of invasive species including running bamboo (October 17); was interviewed about the effects of invasive shrubs on the environment by Barry Yeoman of National Wildlife Magazine (October 20); met with Mike Gregonis, DEEP Wildlife, to discuss the effect of forest management on upland game birds (October 25); moderated the session on management of invasive insects at the 28th Annual Conference on Urban and Community Forestry in Plantsville (October 26); and was co-awardee of the Connecticut Urban Forest Councils Outstanding Urban Forestry Project for the Stormwise roadside management studies (October 26).

DR. ADRIANA ARANGO VELEZ served as Program Chair for the 28th CUFC and 12th Annual Forest Forum Conference "How is the Forest and the Trees along your Street Challenged by Environmental Change?" in Plantsville (170 attendees) (October 26).

DR. ABIGAIL A. MAYNARD spoke about the New Crops Program to Greg Martin from Cornell (October 3); gave a tour of Lockwood Farm and spoke about the New Crops Program to Thomas Morgart, NRCS State Conservationist (October 5); gave a tour of Lockwood Farm to the kindergarten from Hamden Hall Country Day School (16 students, 2 teachers) (October 17); visited and talked about the New Crops Program at the Holbrook Farm in Bethel (October 22); and gave a talk on composting to Daytime Gardeners in North Haven (18 attendees) (October 25).

DR. SCOTT C. WILLIAMS as Executive Treasurer, participated in the 28th Annual Connecticut Urban Forest Council Conference and 12th Annual Forest Forum in Plantsville (October 26).

MR. JOSEPH P. BARSKY along with **MR. MICHAEL R. SHORT** and **MS. MEGAN LINSKE**, staffed the CAES booth at the 28th Annual Connecticut Urban Forest Council Conference and 12th Annual Forest Forum in Plantsville (October 26).

MR. MICHAEL R. SHORT attended the 2016 Connecticut Invasive Plant Working Group Symposium at UConn (October 11).

PLANT PATHOLOGY AND ECOLOGY

DR. SANDRA ANAGNOSTAKIS attended the American Elm Restoration Workshop in Columbus (Delaware) Ohio and discussed CAES elm plantings at Lockwood Farm and previous CAES elm work (70 attendees) (October 25-27).

DR. WADE ELMER attended the Extension/Industry Meeting at the annual meeting of the Northeastern Division of the American Phytopathological Society in Ithaca, NY, chaired the Graduate Student Award session, and presented the talk "Nanoparticles of Micronutrients Suppress Fusarium Wilt of Watermelon" (23 attendees) (October 19-21) and was interviewed by Ms. Jan Spiegel of *The Mirror* on his research program using nanoparticles to suppress plant diseases (October 25).

DR. FRANCIS FERRANDINO attended the Extension/Industry Meeting at the annual meeting of the Northeastern Division of the American Phytopathological Society in Ithaca, NY and presented the talk "Winegrape cultivar trials in Connecticut: 2012 - 2015" (25 attendees) (October 19-21).

DR. YONGHAO LI assisted with the CAES booth at the 2016 Natural Resource Conservation Fair organized by the Southwest Conservation District, held at Lockwood Farm in Hamden (October 4), gave a talk titled "Common Plant Health Problems" for the Milford Garden Club in Milford (20 adult attendees) (October 11); attended the annual meeting of the Northeastern Division of the American Phytopathological Society in Ithaca, NY (October 17-21); gave a talk titled "Plant Health Problems in 2016" in the Industry/Extension Session (35 adult attendees) (October 19); and staffed the "hands-on" table with tree diseases for the Arboriculture 101 class held in Wallingford (35 attendees) (October 26).

DR. ROBERT MARRA attended the annual meeting of the Northeastern Division of the American Phytopathological Society in Ithaca, NY where he presided as secretary/treasurer, attended the forest tour and a tour of a private research farm, and presented "Accurately account for decay and carbon loss in trees: a novel approach using sonic and electrical-resistance tomography (SoT-ERT)" (October 18-20).

DR. NEIL SCHULTES participated in an executive meeting for Sigma Xi at Quinnipiac University (October 13); served as an expert debater in a two-day conference at Western Connecticut State University entitled "Socioeconomic Contexts of Sustainable Agriculture" sponsored by the Institute on Science for Global Policy (October 14-15); attended the annual meeting of the Northeastern Division of the American Phytopathological Society in Ithaca, NY and delivered a short talk entitled "Functional analysis of the uracil transporter (UraA) of *Erwinia amylovora*" (October 19-21).

DR. LINDSAY TRIPLETT arranged the visit of the October Lockwood Lecturer, Dr. Gregory Martin of the Boyce Thompson Institute who presented "Using natural variation in tomato to understand and improve the plant immune system" (October 3), attended the 2016 Northeastern Division Meeting of the American Phytopathological Society, presided over a session of the Graduate Student Awards, and attended the forest tour and a tour of a private research farm (October 18-20).

DR. QUAN ZENG met with Dr. Gregory Martin from Cornell University (October 3); and presented an invited seminar "Emergence and evolution of a turfgrass pathogenic bacteria pathogen *Acidovorax avenae*" at the Stockbridge School of Agriculture at the University of Massachusetts-Amherst and met with Dr. Dan Cooley, Dr. Michelle DaCosta, and Ms. Elizabeth Garofalo from the Stockbridge School of Agriculture at UMass and Dr. Li-Jun Ma from the Department of Biochemistry and Molecular Biology at UMass (October 24).

VALLEY LABORATORY

DR. JATINDER S AULAKH attended the CIPWG annual symposium at UCONN in Storrs and served as moderator (October 11); and attended a meeting with board members of the Wallingford Inland Wetlands Commission for invasive plant management research (October 13).

DR. CAROLE CHEAH gave a talk on HWA biological control at the Nursery and Landscape Research Tour at the Valley Laboratory (15 attendees) (September 15); gave a talk on HWA biological control to the Men's Breakfast Club, McAuley's Assisted Living Community (30 attendees) (September 21); together with Ms. Donna Ellis of the University of Connecticut, assisted by **MR. EMMETT VARRICHIO**, summer research assistant at the Valley Laboratory, presented a poster on Connecticut's program for biological control of mile-a-minute weed at the Connecticut Invasive Plant Working Group Symposium held at UCONN in Storrs (October 11).

MR. EMMETT VARRICHIO, seasonal research assistant working with Dr. Cheah at the Valley Laboratory, gave a talk on the biological control of mile-a-minute weed in Connecticut at the Connecticut Invasive Plant Working Group Symposium held at UCONN in Storrs (125 attendees) (October 11).

DR. RICHARD COWLES presented "Pollinators and Alternatives to Neonics" at the Northeast Pesticide Applicator Certification and Training Conference (a conference for state pesticide extension specialists) in Amherst, MA (25 attendees) (October 25).

MS. ROSE HISKES served on the planning committee and moderated the Aquatic Invasive Plant session at the Connecticut Invasive Plant Working Group's Invasive Plant Symposium at the University of Connecticut Student Union (477 attendees) (October 11); with Forestry personnel, staffed a Station Booth at the Urban Forest Conference at the Aqua Turf Club in Southington (October 26); and with Hilary Kenyon, Northeast Aquatic Research, staffed a display table of invasive aquatic plants at the Friends of Bolton Lakes meeting and Community Forum at Bolton Town Hall (53 attendees) (October 27).

DR. DEWEI LI took a one-month sabbatical leave at Nanjing Forestry University (NJFU) from September 15 to October 14. He made two presentations, "Principles of Research Paper Writing and Publication in English" and "Major Forest Diseases and Insects in the USA" at the College of Forestry, NJFU (45 and 52 attendees respectively). He also made two field trips to Liyang in Jiangsu province to collect fungal specimens. He conducted laboratory work on the hyphomycetes and collaborative studies on fungi associated with pine wood nematode.

DR. DEWEI LI hosted a two-day visit by Jordan McDonnell, VA Sciences, Nunawading, Victoria, Australia working on aeromycology (October 24-25).

DR. JAMES LAMONDIA spoke about nematode management research results at the annual meeting of the Northeast Regional Multistate Nematology Technical Committee (NE-1040) held in Burlington, VT (October 5-7); presented research results during the potato cyst nematode multi-agency research call (20 attendees) (October 11); attended the annual meeting of the Northeastern Division of the American Phytopathological Society held in Ithaca, NY to moderate a contributed paper session and present "Susceptibility of *Buxus* accessions to the boxwood blight pathogen *Calonectria pseudonaviculata*" (60 attendees) (October 18-21); and participated

in the APS Division Forum Representatives meeting held in conjunction with the meeting (October 19).

DR. KATJA MAURER attended the annual meeting of the Northeastern Division of the American Phytopathological Society held in Ithaca, NY and presented two talks titled "Evaluation of hop cultivation feasibility in Connecticut based on yield, growing characteristics, and susceptibility to diseases and pests" (25 attendees) and "Fungicide sensitivity of *Calonectria pseudonaviculata*, causal agent of boxwood blight, in Connecticut" (30 attendees) (October 19-21).

DEPARTMENTAL RESEARCH UPDATES OCTOBER 2016

Covey, K.R., de Mesquita, C.B., Oberle, B., Maynard, D.S., Bettigole, C., Crowther, T.W., Duguid, M.C., **Steven, B**., Zanne, A.E., Lapin, M. and Ashton, M.S., 2016. Greenhouse trace gases in deadwood. *Biogeochemistry*, pp.1-12.

Abstract: Deadwood, long recognized as playing an important role in storing carbon and releasing it as CO_2 in forest ecosystems, is more recently drawing attention for its potential role in the cycling of other greenhouse trace gases. Across three Northeastern and Central US forests, mean methane (CH_4) concentrations in deadwood were 23 times atmospheric levels (43.0 μL L^{-1} ± 12.3; mean ± SE), indicating a lower bound, mean radial wood surface area flux of ~6 × 10^{-4} μmol CH_4 m^{-2} s^{-1}. Site, decay class, log diameter, and species were all highly significant predictors of CH_4 abundance in deadwood, and diameter and decay class interacted as important controls limiting CH_4 concentrations in the smallest and most decayed logs. Nitrous oxide (N_2O) concentrations were negatively correlated with CH_4 (r^2 = −0.20, $p < 0.001$) and on average ~25 % lower than ambient (276.9 nL L^{-1} ± 2.9; mean ± SE), indicating net consumption of nitrous oxide. Oxygen (O_2) concentrations were uniformly near anaerobic (355.8 μL L^{-1} ±1.2; mean ± SE), and CO_2 was elevated from atmospheric (9336.9 μL L^{-1} ± 600.6; mean ± SE). Most notably, our observations that CH_4 concentrations were highest in the least decayed wood, may suggest that methanogenesis is not fuelled by structural wood decomposition but rather by consumption of more labile nonstructural carbohydrates.

Anderson, J. F., F. J. Ferrandino, M P., Vasil, R. H., Bedoukian, M. Maher, and K. McKenzie 2016 Relatively Small Quantities of CO2, Ammonium Bicarbonate, and a Blend of (E)-2-Hexenal plus (E)-2-Octenal Attract Bed Bugs (Hemiptera: Cimicidae)" Journal of Medical Entomology.

Abstract. Improved traps are needed to detect early infestations and for control of bed bugs, and there is need for effective repellents for use on humans or fabrics and to reduce transport of bed bugs. Carbon dioxide released alone or simultaneously with other attractants at the relatively low rate of 1ml/min caught significantly more bed bugs than untreated controls. This finding may enable CO_2 to be used economically in traps. Three percent ammonium bicarbonate released at a rate of 0.01 ml/h or 0.02 ml/h also caught significantly more bed bugs than untreated controls. E-2-hexenal blended with E-2-octenal at concentrations of 0.025% or 0.1% and released at 0.02 ml/h attracted more bed bugs than untreated controls. Repellency of 93% was recorded for a 20% solution of propyl dihydrojasmonate applied to white mice 24h after treatment. Nine repellent compounds consisting of alkyl ketones and cyclic ketones containing 10 to 16 carbon atoms significantly reduced numbers of bed bugs resting on or in Polyester lunch bags, which were serving as surrogate luggage, compared to similar untreated bags. Twenty-five percent propyl dihydrojasmonate provided complete

protection from bed bugs overnight and 96% protection for 27 days. Seven percent 2-(3,7-dimethyl-2,6-nonadien-1-yl) (methyl apritone) + 3 % 3-methyl-5-hexyl-2-cyclohexenone gave 96% protection overnight and total protection for 7 days. DEET (10%) provided 97% protection overnight and 85% protection on day 7 after treatment. A repellent-treated cloth upon which luggage is placed may also protect luggage from becoming infested. Ten g of 6.67% methyl apritone + 3.33% 3-methyl-5-hexyl-2-cyclohexenone + 2.5% tocopherol (used as an antioxidant) applied to a white cloth weighing 53.5 g provided complete protection for 58 days and 92% protection for 87 days; DEET (10%) provided 96% protection overnight and 85% protection on day 7 after treatment.

Read, A.C., F.C. Rinaldi, M. Hutin, Y.-Q. He, **L.R. Triplett**, and A. J. Bogdanove. 2016. Suppression of *Xo1*-mediated disease resistance in rice by a truncated, non-DNA-binding TAL effector of *Xanthomonas oryzae. Front. Plant Sci.*, doi: 10.3389/fpls.2016.01516.

Abstract. Delivered into plant cells by type III secretion from pathogenic *Xanthomonas* species, TAL (transcription activator-like) effectors are nuclear-localized, DNA-binding proteins that directly activate specific host genes. Targets include genes important for disease, genes that confer resistance, and genes inconsequential to the host-pathogen interaction. TAL effector specificity is encoded by polymorphic repeats of 33–35 amino acids that interact one-to-one with nucleotides in the recognition site. Activity depends also on N-terminal sequences important for DNA binding and C-terminal nuclear localization signals (NLS) and an acidic activation domain (AD). Coding sequences missing much of the N- and C-terminal regions due to conserved, in-frame deletions are present and annotated as pseudogenes in sequenced strains of *Xanthomonas oryzae* pv. oryzicola (Xoc) and pv. oryzae (Xoo), which cause bacterial leaf streak and bacterial blight of rice, respectively. Here we provide evidence that these sequences encode proteins we call "truncTALEs," for "truncated TAL effectors." We show that truncTALE Tal2h of Xoc strain BLS256, and by correlation truncTALEs in other strains, specifically suppress resistance mediated by the *Xo1* locus recently described in the heirloom rice variety Carolina Gold. *Xo1* -mediated resistance is triggered by different TAL effectors from diverse *X. oryzae* strains, irrespective of their DNA binding specificity, and does not require the AD. This implies a direct protein-protein rather than protein-DNA interaction. Similarly, truncTALEs exhibit diverse predicted DNA recognition specificities. And, *in vitro*, Tal2h did not bind any of several potential recognition sites. Further, a single candidate NLS sequence in Tal2h was dispensable for resistance suppression. Many truncTALEs have one 28 aa repeat, a length not observed previously. Tested in an engineered TAL effector, this repeat required a single base pair deletion in the DNA, suggesting that it or a neighbor disengages. The presence of the 28 aa repeat, however, was not required for resistance suppression. TruncTALEs expand the paradigm for TAL effector-mediated effects on plants. We propose that Tal2h and other truncTALEs act as dominant negative ligands for an immune receptor encoded by the *Xo1* locus, likely a nucleotide binding, leucine-rich repeat protein. Understanding truncTALE function and

GRANTS RECEIVED OCTOBER 2016

DR. PHILIP ARMSTONG received two awards totaling $240,000 grant from the Centers for Disease Control and Prevention, Epidemiology and Laboratory Capacity for Infectious Diseases Program to support enhanced mosquito trapping and laboratory testing for Zika virus and other mosquito-borne viruses. This is a cooperative agreement between CAES and the Department of Public Health, with DPH being the lead agency.

Title: West Nile Virus Surveillance

Amount: $140,000.00

Summary: The goals of the project are to conduct mosquito surveillance for West Nile virus in Connecticut

Title: Zika Virus Surveillance

Amount $100,000.00

Funding source: CDC

Summary: The goals of this project are to support enhanced mosquito trapping and Zika virus testing in Connecticut.

JOURNAL ARTICLES APPROVED OCTOBER 2016

Bugbee, Gregory J. and **Jennifer M. Fanzutti.** Invasive aquatic plant monitoring report 2014: Candlewood Lake, Lake Lillinonah, Lake Zoar. *Station Bulletin* (digital only)

Bugbee, Gregory J. and **Jennifer M. Fanzutti.** Invasive aquatic plant monitoring report 2015: Candlewood Lake, Squantz Pond, Lake Lillinonah, Lake Zoar. *Station Bulletin* (digital only)

Cheah, C. Update on ongoing hemlock research at Steep Rock. *The Steep Rock Vista*

Elmer, Wade H., Peter Thiel, and **Blaire Steven.** Response of sediment bacterial communities to Sudden Vegetation Dieback in a coastal wetland. *Phytobiomes*

Li, Yonghao, Pamela Sletten, and **Lindsay Patrick**. Seed germination and purity analysis 2016. *CAES Technical Bulletin*

Yue, L., **Chuanxin Ma,** X. Zhan, **Jason C. White,** and B. Xing. Molecular mechanisms of maize seedling response to La_2O_3 NPs exposure: water uptake, aquaporin gene expression and signal transduction. *Environmental Science: Nano*

Zeng, Quan. Fire blight and streptomycin resistance. *Plant Management Network*

ARTICLES OF INTEREST OCTOBER 2016

DR. SANDRA ANAGNOSTAKIS and other participants from Bartlett Arboretum and the National Arboretum listen to Ms. Cornelia Pinchot discuss the elm plantings.

CAES

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Putting Science to Work for Society since 1875

The Connecticut Agricultural Experiment Station

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Putting Science to Work for Society.

Main Laboratories, New Haven

Lockwood Farm, Hamden

Griswold Research Center, Griswold

Valley Laboratory, Windsor

The Connecticut Agricultural Experiment Station

Back and Current issues of Station News are located on our website at http://www.ct.gov/caes/cwp/view.asp?a=2826&q=378188

Station News was prepared and edited by Dr. Theodore G. Andreadis, Ms. Vickie Bomba-Lewandoski, and Ms. Sandra Carney.

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