Station News

The Connecticut Agricultural Experiment Station
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Bee pollinating on a young hemp flower at the experiment hemp plots in Lockwood farm. The plots are being maintained by Dr. Walter Krol, Ms. Terri Arsenault, Mr. Richard Cecarelli, and Dr. Jason C. White. Photo credit to Ms. Kitty Prapayotin-Riveros

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

This Issue

GRANTS RECEIVED AUGUST 2019

The National Christmas Tree Promotion Board announced funded grants for next year. Out of the nine awards, two are at the CAES: "Exploring Sustainable Management for Armored Scales in Christmas Tree Plantations" which is a collaboration between Drs. Richard Cowles and DeWei Li for $36,528, and "Investigating soil acidification mechanisms for inhibiting Phytophthora" which is a collaboration between Drs. Cowles and Blaire Steven for $22,000.

ADMINISTRATION

DR. THEODORE ANDREADIS participated in a spotted lanternfly response planning meeting, held in Jones Auditorium (10 participants) (August 1); was interviewed about the detection of eastern equine encephalitis virus in mosquitoes collected in Voluntown by Smara Abramson, Fox 61 (August 5); was interviewed about the current situation with West Nile virus and eastern equine encephalitis virus in the state by Sam Kantrow, WTNH TV8 (August 6); presided over a quarterly meeting of the Station's Board of Control held at Lockwood Farm (August 7); was interviewed about the closing of campgrounds in the Pachaug State Forest due to the high levels of eastern equine encephalitis virus by NBC 30 (August 16); was interviewed about the current situation with West Nile virus and eastern equine encephalitis virus in the state by WTIC Radio (August 23); was interviewed about the closing of campgrounds and mosquito pesticide spraying due to the increased detection of eastern equine encephalitis virus in the Pachaug State Forest by Gregory Hladky, Hartford Courant (August 23); was interviewed about the impact of the mosquito pesticide spraying in the Pachaug State Forest by Steven Rosenbaum, NBC Connecticut (August 26).

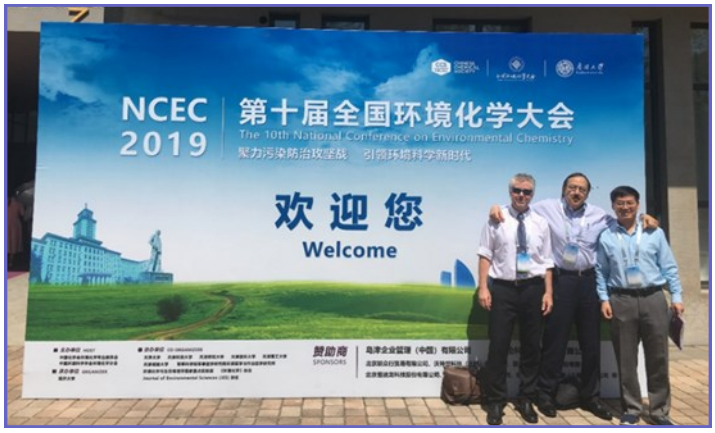
ANALYTICAL CHEMISTRY

DR. JASON C. WHITE participated in a ZOOM call as a PhD committee member for Gurpal Singh of the University of Massachusetts Amherst Stockbridge School of Agriculture (August 1); hosted the bi-weekly Center for Sustainable Nanotechnology (CSN) Nanochem-plant working group ZOOM call (August 6); along with **DR. BRIAN EITZER, DR. WALTER KROL, DR. CHRISTINA ROBB, MS. TERRI ARSENAULT, MR. CRAIG MUSANTE, AND MS. KITTY PRAPAYOTIN-RIVEROS,** participated in the monthly FDA FERN cCAP WebEx call (August 8); was a keynote speaker at the 10th National Conference on Environmental Chemistry (NCEC) 2019 at Nankai University in Tianjin, China and gave a lecture entitled "Nanotechnology and agriculture: Balancing applications and implications" (150 attendees) (August 14-19); gave an invited lecture at Zhejiang University in Hangzhou China entitled "Suppression of crop disease with nanoscale micronutrients" (100 attendees) (August 19-21); participated in a CSN Faculty call (August 19, 30); along with **DR. NUBIA ZUVERZA-MENA** and **DR. SARA NASON,** attended a meeting of PFAS testing laboratories held at the Department of Public Health Laboratory in Rocky Hill and attended the CT PFAS Taskforce meeting held at the Legislative Office Building in Hartford (August 28); and hosted the monthly meeting of the CAES J-1 Visa recipients (August 30).

DR. BRIAN EITZER was a participant in the Agricultural Feed Regulatory Program Standards annual meeting held in Mobile, AL (August 27-29).

MS. KITTY PRAPAYOTIN-RIVEROS participated in the US FDA Sample Analysis Data Exchange - IT Implementation Phase work group WebEx call (August 6); and presented ISO/IEC 17025 audit/transition with new standard 2017 version and on the mentor laboratory panel discussion at the 2019 Animal Feed Regulatory Program Standards (AFRPS) Face-to-Face Meeting held in Mobile, AL (~100 attendees) (August 27-29).

MS. KITTY PRAPAYOTIN-RIVEROS giving a presentation on ISO/IEC 17025 audit/transition with new standard 2017 version and on the mentor laboratory panel discussion at the 2019 Animal Feed Regulatory Program Standards (AFRPS) Face-to-Face Meeting in Mobile, Alabama.



Jason C. White, Jorge Gardea-Torresdey (UTEP), and Baoshan Xing (UMass) at the 14th National Conference on Environmental Chemistry (14th NCEC) at Nankai University in Tianjin China

Jason C. White lecturing on sustainable nanotechnology and nano-enabled agriculture at Zhejiang University's College of Environmental and Resource Sciences, Institute of Environmental Processes in Hangzhou China.

ENTOMOLOGY

DR. KIRBY C. STAFFORD III participated in a spotted lanternfly response planning meeting held in Jones Auditorium (10 participants) (August 1); participated in a conference call of the Tick Biology, Ecology and Control subcommittee of the Tick Borne Disease Working Group and presented on tick integrated tick management (August 12); was interviewed by Patrick Skahill, WNPR, about the gypsy moth outbreak (August 14); hosted the visit by Yale Microbiology Fellow Dr. Hasan Fadlallah (August 14-15); spoke on ticks and tick-borne diseases at the Falls Avenue Community Center in Watertown (15 attendees) (August 23); was interviewed about the Asian longhorned tick and lone star tick by Robert Miller, Danbury News-Times (August 26); and participated in a conference call of the Tick Biology, Ecology and Control subcommittee of the Tick Borne Disease Working Group and presented on ticks and integrated tick management (August 26).

MS. KATHERINE DUGAS supervised and participated in a spotted lanternfly response planning meeting held in Jones Auditorium (10 participants) (August 1); and scheduled a follow-up conference call for SLF for August 8, and set up and staffed a CAES booth at the Woodstock Fair (August 31).

DR. MEGAN LINSKE participated in a conference call with US Biologic to discuss revisions and submission of current collaborative manuscripts (August 16); was invited to serve on the Wildlife Society's Leadership Institute Committee by President elect Gary White (August 19).

DR. GALE E. RIDGE was interviewed about the status of native Goldenrod as an important plant for pollinators and why it has been classified as a weed by Bob Miller of the News-Times (August 20).

DR. CLAIRE E. RUTLEDGE was interviewed about the emerald ash borer by Julia Werth of the Connecticut Examiner (August 23), which lead to the article https://ctexaminer.com/2019/08/26/a-die-off-of-3-5-of-connecticuts-forests-within-5-years-from-invasive-ash-borer/; and her intern Ester Kim presented a talk entitled "Sun and shade: How important is light in the capture of parasitic wasps by yellow pan traps?" in Jones Auditorium (40 attendees) (August 8).

DR. VICTORIA L. SMITH participated in a spotted lanternfly response planning meeting held in Jones Auditorium (10 participants) (August 1); participated in a meeting of the Yale Biosafety Committee in New Haven (20 participants) (August 15); and with DR. ROBERT MARRA, coordinated a site visit to the newly-documented occurrence of beech leaf disease in Fairfield County. Individuals from the towns of Greenwich and Stamford, DEEP foresters, CAES, and the Durham (NH) Field Office of the US Forest Service participated (August 21).

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO met with Indrajeet Chaubey, Dean of the College of Agriculture, Health and Natural Resources, University of Connecticut, Storrs and introduced the activities of the Environmental Sciences Department (July 12); and gave a keynote lecture entitled "Some properties of wood-derived char important for their interactions with organic compounds" at the International Symposium on Organic Geochemistry held at Peking University Beijing, China (approx. 300 total attendees; approx. 100 students) (August 7-9).

DR. PHILIP ARMSTRONG interviewed by WTIC about the first detection of West Nile virus in Connecticut during 2019 (August 1) and about the detection of EEE virus in mosquitoes and camp closure at Pachaug State Forest (August 16); interviewed by the CT Post about mosquito and arbovirus activity in Connecticut (August 13) and about the expansion of WNV into new towns (August 20);

interviewed by the Boston Globe on the mosquito ecology and epidemiology of EEE virus (August 20); interviewed by the Journal Inquirer (August 22) about EEE virus and West Nile virus risk in Connecticut; interviewed by NBC news about EEE virus ecology and epidemiology (August 27) and NBC Connecticut about the links between climate change and mosquito abundance/seasonality (August 28).

MR. GREGORY BUGBEE, with Deanna Rackie, gave an Invasive Aquatic Plant Workshop sponsored by the Southbury Conservation Commission held at the Southbury Town Hall (approx. 35 attendees) (August 27); and was interviewed about Connecticut's Invasive Aquatic Plant Problems by the Republican-American (August 28).

DR. JOSEPH R. McMILLAN presented a talk entitled "The biology and control of mosquitoes and their diseases in Connecticut" at the Willow Plaza Community Center in Waterbury (approx. 15 attendees) (August 13).

DR. GOUDARZ MOLAEI hosted Dr. Hasan Fadlallah, a Yale Microbiology Fellow, at the Tick Testing Laboratory and discussed TTL services and research on mosquito- and tick-borne pathogens (August 14).

DR. SARA NASON served as a judge for student presentations at the Plant Health and Protection Research Symposium held at CAES (August 8); participated in meetings in Hartford of the Remediation and Human Health committees that advise the Connecticut Interagency PFAS Taskforce (August 16); participated in a meeting in Rocky Hill of Connecticut chemists working on PFAS analysis (August 28); attended the second meeting of the Connecticut Interagency PFAS Taskforce and participated in a PFAS Sampling Subcommittee meeting in Hartford (August 28); and toured the lab of Dr. Vasilis Vasiliou and met with postdoc Jeremy Koelmel to discuss future research collaboration at the Department of Environmental Health Sciences at the Yale School of Public Health (August 29).

DR. BLAIRE STEVEN presented a talk entitled "Assessing the resilience of biocrusts by tracking their recovery from disturbance" at Biocrust4 held in North Stradbroke Island, Australia (95 attendees; approx. 40 students) (August 25–30).

FORESTRY AND HORTICULTURE

DR. JEFFREY S. WARD lead a field tour of oak stands in Voluntown for the kickoff meeting of the Increasing Resiliency in Southern New England Oak Forests project (10 attendees) (August 14); met with Hallie Metzger (Rebekah's Hill Flora and Fauna Preservation Society) and Kate Losey (Weantinoge Heritage Land Trust) in Goshen to discuss forest management and invasive control (August 19); met with Joel Bronson and Russell M. Russ (Great Mountain Forest) in Norfolk to discuss forest management (August 19); and participated in an NESAF 2020 planning committee conference call (August 27).

DR. ABIGAIL A. MAYNARD inspected and made suggestions on improving the food composting operation at Wesleyan University in Middletown (2 students, 1 teacher) (August 1); and discussed the New Crops Program at Vaiuso's Farms in Branford (August 12).

DR. SCOTT C. WILLIAMS participated in a collaborative meeting with CT DEEP, CT Audubon, and the Town of Guilford for the Steering Committee of the East River Marsh Management Plan (August 1); and participated in a conference call on collaborative research updates with US Biologic, Inc. (August 23).

MR. JOSEPH P. BARSKY participated in an NESAF 2020 planning committee conference call (August 27).

PLANT PATHOLOGY AND ECOLOGY

DR. ZHOUQI CUI co-organized a workshop entitled "Effector Visualization: Teaching & Research Tools for Studying Pathogen Effectors During Infection" and introduced the technique of using the dual fluorescence reporter to visualize virulence gene expression in plant pathogenic bacteria at the Plant Health 2019 conference held in Cleveland, OH (28 adults attendees) (August 3); and presented a poster presentation entitled "Cell-length heterogeneity: A population-level solution to growth/virulence trade-offs in the plant pathogen *Dickeya dadantii*" at the same conference (100 adult attendees) (August 5).

DR. WADE ELMER attended the Annual Meeting of the American Phytopathological Society (APS) held in Cleveland OH, and served as Vice Chair of the Diseases of Ornamental Plant Committee and as member of the Widely Prevalent Fungal disease committed, and was presented with the APS award of Fellow (August 3-6); participated in the Ph.D. committee meeting for Ms. Cora McGehee at UConn, Stores (5 attended) (14 August); along with members of the Connecticut Hiking Alliance harvested 33 boxes of eggplants, 32 boxes of tomatoes, 32 boxes of apples, and 17 boxes of peppers at Lockwood Farm for the Connecticut Food Share (42 adults, 3 children attended) (August 25); and gave a the presentation entitled "Nanoparticles of Cu and Si for Plant Disease Control" at the Fall meetings of the American Chemical Society held in San Diego, CA (23 attendees) (September 26-29).

DR. YONGHAO LI was interviewed about "Hail, don't scold, the useful goldenrod" by Robert Miller of the Danbury News-Times (August 20); and gave a lecture entitled "Disease management in landscapes" for the NOFA Accreditation Course in Organic Land Care in New Haven (30 adults) (August 22).

DR. ROBERT MARRA joined **DRS. VICTORIA SMITH** and **JAMES LAMONDIA** in a site visit to Mianus River Park, in Stamford and Greenwich, along with local, state, and U.S. Forest Service personnel to view an outbreak of Beech Leaf Disease, caused by a foliar nematode (20 adults) (August 21); attended a workshop on oak wilt diagnostics and management held at the University of Minnesota (40 adults) (August 26-29); and participated in a webinar on Beech Leaf Disease, hosted by the Ohio Department of Natural Resources (August 28).

DR. LINDSAY TRIPLETT attended Plant Health 2019 in Cleveland, OH, where she participated in an August 3rd workshop "The Plant Root System: Gateway to Plant-Beneficial Rhizosphere Microbiome Interactions." She gave an oral presentation entitled "A group plot experiment to incorporate agricultural field research training into summer undergraduate internships" (21 attendees) (August 5), and a poster presentation entitled "Evaluation of a single seedling treatment with nanoscale nutrients to control Fusarium wilt symptoms of Chrysanthemum" (60 attendees) (August 5); and coordinated and hosted the final symposium for the Plant Health Fellows summer internship program for undergraduates (45 attendees) (August 8). The ten symposium participants each presented a five-minute summary of their summer research project.

Wade Elmer was presented with the APS award of Fellow in Cleveland, OH.

Member of the Connecticut Hiking alliance harvested fruit and vegetables at Lockwood Farm

Participants in the third Plant Health Fellows internship program celebrate in Jones Auditorium after a successful research symposium. Pictured (L-R) are Amanda DeLucia, Carlos Calderon, Kylee Brown, Olivia Rianhard, Alenka Mora, Kate Manning, Harvey Ng, Ethan Tippett, Esther Kim, and Kawai Navares.

VALLEY LABORATORY

DR. JATINDER AULAKH attended the International Christmas Tree Research and Extension Conference held in Quebec, Canada (August 25-30).

DR. RICHARD COWLES attended the Exotic Conifers Association and presented "Preplant fertilizer aids initial establishment" in Lehighton, PA (35 attendees) (August 8); and gave a poster presentation entitled"Sulfur amendment to soil for phytophthora root rot management" at the International Christmas Tree Research and Extension Conference held in Quebec City, Canada (40 attendees) (August 25-30).

DR. JAMES LAMONDIA participated in the APS Division Forum meeting as Past-Chair and presented a poster entitled "The effects of sanitizers on *Calonectria pseudonaviculata* conidia and microsclerotia viability" during the American Phytopathological Society annual meeting held in Cleveland, OH (August 3-6); met with Universal Leaf horticulturalist Ben Green and Universal plant breeder Dr. Marcio Ender from Brazil to discuss the Connecticut tobacco breeding program (August 15); and was interviewed about Connecticut broadleaf tobacco by Phil Gruber of Lancaster Farming newspaper (August 27).

DEPARTMENTAL RESEARCH UPDATES AUGUST 2019

Cao, X.; DeLoid, G.M.; Bitounisa, D.; De La Torre-Roche, R.; **White, J.C.**; Zhang, Z.; Guan, H.C.; Nga, K.W.; Zhong, W.; Eitzer, B.D.; Demokritou, P. 2019. Co-exposure of food additives SiO2 (E551) and TiO2 (E171) with pesticide boscalid and effects on cytotoxicity and bioavailability of boscalid using a tri-culture small intestinal epithelium cell model: Potential health implications. *Environ. Sci.: Nano*. DOI: 10.1039/c9en00676a.

Abstract- Many toxicity investigations have evaluated the potential health risks of ingested engineered nanomaterials (iENMs); however, few have addressed the potential synergistic effects of iENMs with other toxic compounds (e.g. pesticides) in food. To address this knowledge gap, the combined cytotoxic effects of pesticide boscalid and common engineered particulate food additives, TiO_2 (E171) and SiO_2 (E551), whose size distributions include substantial fractions in the nanoscale, as well as their effects on cellular uptake and boscalid translocation, were investigated. An *in vitro* digestion system was used to digest a fasting food model (phosphate buffer) containing iENM (1% w/w), boscalid (10 or 150 ppm), or both. The resulting small intestinal phase digesta was applied to an *in vitro* tri-culture small intestinal epithelium model, and effects on cell layer integrity, viability, cytotoxicity and production of reactive oxygen species (ROS) were assessed. Boscalid uptake and translocation was also quantified by LC/MS. Cytotoxicity and ROS production in cells exposed to combined iENM and boscalid were greater than in cells exposed to either iENM or boscalid alone. More importantly, translocation of boscalid across the tri-culture cellular layer was increased by 20% and 30% in the presence of TiO_2 and SiO_2, respectively. One possible mechanism for this increase is diminished epithelial cell integrity indicated by elevated oxidative stress and cytotoxicity in co-exposed cells. In addition, analysis of boscalid in digesta supernatants revealed 16% and 30% more boscalid in supernatants from samples containing TiO_2 and SiO_2, respectively, suggesting that displacement of boscalid from flocculated digestive proteins by iENMs may also contribute to the increased translocation.

Hyde, J., Gorham, C., **Brackney**, **D.E., Steven**, **B.*** Antibiotic resistant bacteria and commensal fungi are common and conserved in the mosquito microbiome, PLOS One; DOI:https://doi.org/10.1371/journal.pone.021890

Abstract- The emerging and increasing prevalence of bacterial antibiotic resistance is a significant public health challenge. To begin to tackle this problem, it will be critical to not only understand the origins of this resistance but also document environmental reservoirs of antibiotic resistance. In this study we investigated the possibility that both colony and field caught mosquitoes could harbor antibiotic resistant bacteria. Specifically, we characterized the antibiotic resistant bacterial populations from colony-reared Aedes aegypti larvae and adults and two field caught mosquito species Coquillettidia perturbans and Ochlerotatus canadensis. The cultured bacterial populations were dominated by isolates belonging to the class Gammaproteobacteria. Among the antibiotic resistant populations, we found bacteria resistant to carbenicillin, kanamycin, and tetracycline, including bacteria resistant to a cocktail of all three antibiotics in combination. The antibiotic resistant bacteria were numerically rare, at most 5% of total cell counts. Isolates were characterized by 16S rRNA gene sequencing, and clustering into Operational Taxonomic Units (OTUs; 99% sequence identity). 27 antibiotic resistant OTUs were identified, although members of an OTU did not always share the same resistance profile. This suggests the clustering was either not sensitive enough to distinguish different bacteria taxa or different antibiotic resistant sub-populations exist within an OTU. Finally, the antibiotic selection opened up a niche to culture mosquito-associated fungi, and 10 fungal OTUs (28S rRNA gene sequencing) were identified. Two fungal OTUs both classified to the class Microbotryomycetes were commonly identified in the field-caught mosquitoes. Thus, in this study we demonstrate that antibiotic resistant bacteria and certain fungi are common and conserved mosquito microbiome members. These observations highlight the potential of invertebrates to serve as vehicles for the spread of antibiotic resistance throughout the environment.

Molaei*, G., Karpathy, S.E., and **Andreadis, T.G.**, "First Report of the Introduction of An Exotic Tick, Amblyomma Coelebs (Acari: Ixodidae), Feeding on A Human Traveler Returning to The United States from Central America," Journal of Parasitology 2019 105(4) 571–575; (August 8).

Abstract- Introduction of ticks into the United States that can carry disease-causing pathogens to humans, companion animals, and wildlife has accelerated in recent years, mostly due to globalization, frequency of travel, and a rise in legal and illegal animal trades. We hereby

report for the first time introduction of a live fully engorged Amblyomma coelebs feeding on a human into the United States from Central America. Amblyomma coelebs is geographically distributed in the Neotropical region and reaches the southern states of Mexico. This species is capable of transmitting a number of pathogens of public health and veterinary importance including spotted fever group rickettsiae, raising concern that A. coelebs, if it became established in the United States, might also be able to carry these pathogens. Considering the risks of exotic ticks as vectors of numerous pathogens and their potential to establish new populations under conducive climatic and habitat conditions, rigorous inspection practices of imported livestock and pet animals at ports of entry are vital. It is also important for travelers and practitioners to develop a heightened awareness of the public health risks associated with the unintended importation of exotic ticks and the potential such parasites have for breaching United States biosecurity defenses.

Ruiz, Mercedes, **Yang**, **Y.,** Lochbaum, C.A., Delafield, D.G., **Pignatello**, **J.J.,** Li, L., and Pedersen, J.A.*, Peroxymonosulfate Oxidizes Amino Acids in Water without Activation, Environ. Sci. Technol. DOI: 10.1021/acs.est.9b01322 (online August 2).

Abstract-A variety of peptidic and proteinaceous contaminants (e.g., proteins, toxins, pathogens) present in the environment may pose risk to human health and wildlife. Peroxymonosulfate is a strong oxidant (EH 0 = 1.82 V for HSO5 −, the predominant species at environmental pH values) that may hold promise for the deactivation of proteinaceous contaminants. Relatively little quantitative information exists on the rates of peroxymonosulfate reactions with free amino acids. Here, we studied the oxidation of 19 of the 20 standard proteinogenic amino acids (all except cysteine) by peroxymonosulfate without explicit activation. Reaction half-lives at pH 7 ranged from milliseconds to hours. Amino acids possessing sulfur-containing, heteroaromatic, or substituted aromatic side chains were the most susceptible to oxidation by peroxymonosulfate, with rates of transformation decreasing in the order methionine > tryptophan > tyrosine > histidine. The rate of tryptophan oxidation did not decrease in the presence of an aquatic natural organic matter. Singlet oxygen resulting from peroxymonosulfate self-decomposition, while detected by electron paramagnetic resonance spectroscopy, was unlikely to be the principal reactive species. Our results demonstrate that peroxymonosulfate is capable of oxidizing 19 amino acids without explicit activation and that solvent-exposed methionine and tryptophan residues are likely initial targets of oxidation in peptides and proteins.

Peng, J., Triplett, L.R., Schachterle, J.K., and Sundin, G.W., 2019. A Chromosomally Encoded hok-sok Toxin-Antitoxin System in the Fire Blight Pathogen Erwinia amylovora: Identification and Functional Characterization. Applied and Environmental Microbiology 85:e00724-19.

Abstract- Toxin-antitoxin (TA) systems are genetic elements composed of a protein toxin and a counteracting antitoxin that is either a noncoding RNA or protein. In type I TA systems, the antitoxin is a noncoding small RNA (sRNA) that base pairs with the cognate toxin mRNA interfering with its translation. Although type I TA systems have been extensively studied in Escherichia coli and a few human or animal bacterial pathogens, they have not been characterized in plant-pathogenic bacteria. In this study, we characterized a chromosomal locus in the plant pathogen Erwinia amylovora Ea1189 that is homologous to the hok-sok type I TA system previously identified in the Enterobacteriaceae-restricted plasmid R1. Phylogenetic analysis indicated that the chromosomal location of the hok-sok locus is, thus far, unique to E. amylovora. We demonstrated that ectopic overexpression of hok is highly toxic to E. amylovora and that the sRNA sok reversed the toxicity of hok through mok, a reading frame presumably translationally coupled with hok. We also identified the region that is essential for maintenance of the main toxicity of Hok. Through a hok-sok deletion mutant (Ea1189Δhok-sok), we determined the contribution of the hok-sok locus to cellular growth, micromorphology, and catalase activity. Combined, our findings indicate that the hok-sok TA system, besides being potentially self-toxic, provides fitness advantages to E. amylovora.

JOURNAL ARTICLES APPROVED AUGUST 2019

Allan-Perkins, Elisha, **De-Wei Li**, **Neil Schultes**, S. Yavuz, and **James A. LaMondia**. The identification of a new species, *Diaporthe humulicola*, a pathogen causing Diaporthe leaf spot on common hops. *Plant Disease*

Aulakh, Jatinder S. Giant hogweed (*Heracleum mantegazzianum*) identification and management. *CAES Fact Sheet*

Cowles, Richard S. Sulfur amendment of soil improves establishment and growth of firs in a field naturally infested with Phytophthora. *Journal of Environmental Horticulture*

Li, De-Wei, **Neil P. Schultes**, **James A. LaMondia**, and **Richard S. Cowles**. *Phytophthora abietivora*, a new species isolated from diseased Christmas trees in Connecticut, USA. *Plant Disease*

Liao, Y. Y., A. Strayer-Scherer, **Jason C. White**, **Roberto De La Torre-Roche**, L. Ritchie, J. Colee, G. E. Vallad, J. Freeman, J. B. Jones, and M. L. Paret. Particle-size dependent bactericidal activity of magnesium oxide against *Xanthomonas perforans* and bacterial spot of tomato. *Scientific Reports*

McMillan, Joseph R., Philip M. Armstrong, and **Theodore G. Andreadis**. Patterns of mosquito and arbovirus community composition and ecological indexes of arboviral risk in the northeast United States. *PLOS NTDs*

Molaei, Goudarz, Eliza A. H. Little, Scott C. Williams, and **Kirby C. Stafford III.** Bracing for the worst: Will the rise of the lone star tick, *Amblyomma americanum*, alter the northeastern tick-borne disease landscape? *New England Journal of Medicine*

Tian, L., H. Zhang, X. Zhao, X. Gu, **Jason C. White**, X. Li, L. Zhao, and R. Ji. CdS nanoparticles induce metabolic reprogramming in broad bean (*Vicia faba* L.) roots and leaves. *Environmental Science & Technology*

Yang, Z., Y. Yan, A. Yu, B. Pan, and **Joseph J. Pignatello**. Are the phenanthroline and ferrozine colorimetric methods reliable for quantifying Fe(II) in Fenton reaction systems? *Analytica Chimica Acta*

Zhang, K., M. Qiao, Z. F. Yu, **De-Wei Li**, and R. F. Castañeda-Ruiz. Morganjonesia gen. nov. for two atypical *Corynespora* and *Teratosperma* species. *Mycotaxon*

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Putting Science to Work for Society since 1875

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The Connecticut Agricultural Experiment Station

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