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.
ADMINISTRATION

DR. THEODORE ANDREADIS presented a talk entitled “Jamestown Canyon Virus Revisited: Are We Neglecting an Under Recognized Vector-Borne Disease” at the 64th Annual Meeting of the Northeastern Mosquito Control Association held in Nashua, NH (150 attendees) (December 3-5).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE attended the Laboratory Preparedness Advisory Group monthly meeting at the CT DPH Laboratory in Rocky Hill (December 3); participated in a teleconference call for the US FDA Sample Analysis Workgroup Meeting (December 4); hosted Dr. Michael Rickenbach of the State of CT - Department of Emergency Services & Public Protection Division of Scientific Services for the CAES Seminar Series (December 5); participated in weekly “All Hands” ZOOM calls as part of the Center for Sustainable Nanotechnology (CSN) (December 5, 12, 19); co-hosted potential Dr. Sara Nason of Johns Hopkins University during her interview for the CAES Environmental Chemist Assistant Scientist II position (December 6-7); participated in the 2019 FDA AFRPS Face-to-Face Planning Committee Calls (December 6, 13, 20); participated in a teleconference call with the Department of Consumer Protection, Department of Agriculture, and Department of Public Health on the formation of an FDA-funded Rapid Response Team in CT (December 11); along with DR. BRIAN EITZER, DR. CHRISTINA ROBB, DR. WALTER KROL, MR. CRAIG MUSANTE, AND MS. TERRI ARSENAULT, participated in the monthly FDA FERN cCAP WebEx call (December 13); chaired the quarterly CAES Safety Committee Meeting (December 14); participated in a monthly Faculty/PI ZOOM call for the Center for Sustainable Nanotechnology (December 14); and spoke by phone with Prof. Philip Demokritou of Harvard University about a new collaborative project with Nanyang Technological University in Singapore (December 28).

DR. BRIAN EITZER was a participant in the conference call of the organizing committee of the North American Chemical Residue Workshop (December 13)

DR. CHRISTINA ROBB attended the Eastern Analytical Symposium (EAS) board meeting in Princeton, NJ (December 7).

DR. NUBIA ZUVERZA-MENA was a co-principal investigator (Co-PI) recipient of the Louis A. Magnarelli Post-Doctoral Program along with DR. WASHINGTON DA SILVA as the PI. The project will bring a postdoctoral scientist to conduct research on the use of nanoparticles as a delivery system for dsRNAs to combat plant viruses (December 14).
DR. KIRBY C. STAFFORD III was interviewed about rodent targeted vaccines by Angus Chen for Scientific American (December 20).

MR. MARK H. CREIGHTON presented beekeeping information to The Sound School Beekeeping program in New Haven (20 student attendees) (December 10); was interviewed at CAES by a student from Fairfield Wheeler Interdistrict Magnet School in Bridgeport for an honors project on honey bee health-related topics (December 13); and met with the President of The Connecticut Beekeepers Association in Lyme to discuss and plan topics for the upcoming Beekeeping School being offered here at CAES on January 12 (December 21).

MS. KATHERINE DUGAS conducted a training at the Rhode Island DEM office in Providence in the use of the NAPIS database for the State Survey Coordinators of RI and MA at USDA-APHIS-PPQ request (December 4).

DR. MEGAN LINSKE participated in a conference call with US Biologic on data management and future research opportunities for large-scale tick and tick-borne disease predictive management modeling and applications (December 6); and participated in a conference call with US Biologic on current, collaborative manuscripts and future publications (December 10).

DR. GALE E. RIDGE spoke about bed bugs to staff at the Connecticut Department of Mental Health in Stamford (45 attendees) (December 11); and was interviewed in a Yale University podcast “When we talk about animals” with a focus on delusions of parasitosis (December 12).

DR. CLAIRE E. RUTLEDGE talked with forestry students from Nonnewaug High School in Woodbury about invasive insects in Ansonia (30 youths) (December 7); and served as an examiner for the oral portion of the state arborist license exams in New Haven (December 12).

DR. PHILIP ARMSTRONG gave a talk entitled “Evaluation of Novel Trapping Methods for Monitoring Aedes spp.” at the Annual Meeting of the Northeastern Mosquito Control Association, Nashua, NH (approx. 150 attendees) (December 4).

DR. BLAIRE STEVEN gave an invited talk entitled “Biological Soil Crusts as a Model for Soil Carbon Cycling” in the Department of Molecular and Cellular Biology at the University of Connecticut in Storrs (15 faculty and 45 student attendees) (December 4).

MR. JOHN SHEPARD gave two invited talks entitled “Arbovirus Activity in Connecticut, 2018” and “Entomologist Challenge - Aedes cinereus” at the 64th Annual Meeting of the Northeastern Mosquito Control Association held in Nashua, NH (approx. 150 attendees) (December 3-5).

FORESTRY AND HORTICULTURE

DR. JEFFREY S. WARD, along with MR. JOSEPH P. BARSKY, met with David Gumbart and Wayne Woodard with CT-TNC and Larry Rousseau (CT DEEP) to discuss forest management options after severe storm damage (December 5); administered practical and oral examinations to arborist candidates for the Connecticut Tree Protection Examining Board (December 12); hosted a New England Society of American Foresters Executive Committee quarterly meeting (December 19); and was interviewed about ice storm damage by Bob Miller of the Danbury News-Times (December 19).

DR. ABIGAIL A. MAYNARD spoke about winter botany to 3rd graders at Hamden Hall Country Day School (18 children, 2 teachers) (December 10); participated in a planning meeting of the New England Vegetable and Fruit Conference in Goffstown, New Hampshire (December 12).

DR. SCOTT C. WILLIAMS participated in a conference call for the Editorial Advisory Board of The Wildlife Professional (December 6); and participated in a conference call with US Biologic, Inc. on research and data management for large-scale tick and tick-borne disease predictive and adaptive modeling frameworks (December 6).

PLANT PATHOLOGY AND ECOLOGY

DR. ROBERT MARRA administered oral examinations to arborist candidates for the Connecticut Tree Protection Examining Board at in New Haven (3 adults) (December 12); met via conference call with fellow members of the Steering Committee for the Connecticut Conference on Natural Resources (8 adults) (December 20); and met via conference call with fellow members of the Executive Committee of the Northeastern Division of the American Phytopathological Society (5 adults) (December 20).

DR. NEIL SCHULTES gave a lecture entitled “Genetically Modified Plants in Agriculture” to Science Course Sci 031 at Yale University (10 adults) (December 7).
MS. ROSE HISKES presented an invasive insect scenario to Connecticut Tree Protective Association Arboriculture 101 students during review night in Wallingford (39 students) (December 5); and participated in a Connecticut Invasive Plants Working Group Symposium Planning Committee meeting at the Connecticut Forest and Parks Association in Middlefield (December 6).

DR. JAMES LAMONDIA participated in the Connecticut Agricultural Information Council meeting regarding Agriculture Day at the Capitol and the Connecticut Outstanding Young Farmer Award held at the Valley Laboratory in Windsor (December 4); and conducted oral exams for candidates for the Connecticut arborist license and participated in the quarterly meeting of the Connecticut Tree Protection Examining Board in New Haven (December 12).


Abstract- Asparagus decline and the replant problem were both defined in the 1950s, but had been noted in asparagus fields long before. Although both conditions share many of the same features, there are distinct differences in the host symptoms and in the age of the field during the onset of symptoms. A number of factors contribute to both disorders. Abiotic factors, such as allelopathic residues, acidic soils, soil compaction, winter crown injury, and excessive harvest pressure, along with biotic agents like insects, weeds, and diseases contribute to decline and the replant problem. Toxic asparagus residues remain the major stressor in the replant problems. Although cultivar improvements along with close attention to reducing stress and disease outbreaks has lessened the damage from asparagus decline and the replant problem, these disorders still make serious inroads into field longevity and yield potential. The presentation will synthesize the results of numerous studies designed to enhance soil health and reduce asparagus decline and the replant problem. An assessment of the direction for future research projects will be presented.

How viruses evolve within hosts can dictate infection outcomes; however, reconstructing this process is challenging. We evaluate our multiplexed amplicon approach, PrimalSeq, to demonstrate how virus concentration, sequencing coverage, primer mismatches, and replicates influence the accuracy of measuring intrahost virus diversity. We develop an experimental protocol and computational tool, iVar, for using PrimalSeq to measure virus diversity using Illumina and compare the results to Oxford Nanopore sequencing. We demonstrate the utility of PrimalSeq by measuring Zika and West Nile virus diversity from varied sample types and show that the accumulation of genetic diversity is influenced by experimental and biological systems.


In the present study, we investigated the antifungal effects of engineered nanomaterials (NMs) against *Podosphaera pannosa* (*P. pannosa*), a fungal pathogen that causes powdery mildew on plants in the rose family. Rose leaves were placed in water-agar plates and foliar-exposed to suspensions of four commonly used nanomaterials (NM), including multi-wall carbon nanotubes (MWCNTs), reduced graphene oxide (rGO), copper oxide (CuO) nanoparticles (NPs) and titanium oxide (TiO2) NPs, which was also inoculated with *P. pannosa* conidia. After a 19-day standard infection test, the growth of *P. pannosa* on rose leaves was evaluated. All four NMs inhibited infection by *P. pannosa* at the concentration 200 mg/L, whereas only CuO NPs decreased fungal growth at 50 mg/L. The phytohormone content of the leaves was measured across all treatments to investigate potential NMs antifungal mechanisms. The results suggest that NMs increased plant resistance to fungal infection by altering the content of endogenous hormones, particularly zeatin riboside (ZR). Our study demonstrates that NMs exhibited distinctly antifungal effects against *P. pannosa* on rose, and could be utilized as a novel plant protection strategy after a comprehensive assessment of potential environmental risk.


*Bambusa multiplex* has been broadly cultivated in China and has significant economical, ecological and ornamental importance. A canker on the culm of *B. multiplex* was first time discovered in 2015 in Shanghai, China. In this study, the fungal isolate XSZ-1 isolated from the infected tissues was determined to be a pathogen of canker on the culm of *B. multiplex* by fulfilling Koch’s postulates. The fungal pathogen was identified as *Fusarium incarnatum* based on the morphological characteristics and phylogenetic analyses with the sequences of ITS, TEF-1α and RPB2. To our knowledge, this is the first report of a canker on the culm of *B. multiplex* caused by *F. incarnatum* worldwide.

LaMondia, J. A., R. L. Wick and N. A. Mitkowski. 2018. Plant Parasitic Nematodes of
JOURNAL ARTICLES APPROVED DECEMBER 2018


Aulakh, Jatinder S. Weeds of Ornamental Plants and Their Control. *CAES Fact Sheet*


He, F., A. Kange, Y. Jia, P. Laborda, B. Li, Y. Zhao, Quan Zeng, and F. Liu. Identification and Characterization of a Stem Canker and Twig Dieback Disease of Pear Caused by Neofusicoccum parvum in China. *Plant Disease*


Li, Yonghao. Peach Leaf Curl. *CAES Fact Sheet*

Li, Yonghao. Stemphylium Gray Leaf Spot of Tomato. *CAES Fact Sheet*

Schachterle, J., Quan Zeng, and G. Sundin. Three Hfq-Dependent Small RNAs Regulate Flagellar Motility and Modulate Virulence in the Fire Blight Pathogen *Erwinia amylovora*. *Environmental Microbiology*


Yang, J., C. Xie, Y. Ma, Chuanxin Ma, Jason C. White, Y. Wang, X. He, P. Zhang, Y. Ding, Y. Rui, B. Xing, and Z. Zhang. Effect of Ceria and Cerium(III) Ions on Soil Enzyme Activity and Bacterial Community Structure in a Soil-Plant System. *Environmental Chemistry*

ARTICLES OF INTEREST DECEMBER 2018

**Louis A. Magnarelli Post-Doctoral Award**

The annual Louis A. Magnarelli Post-Doctoral Award was announced at the CAES Annual Recognition Awards Tea held on December 14. The award was given to Washington da Silva, Ph.D. and Nubia Zuverza-Mena, Ph.D., from the Department of Plant Pathology and Ecology and the Department of Analytical Chemistry, respectively. The title of their project is “Using Nanoparticles to Deliver dsRNA for Controlling Destructive Plant Viruses.” This year, seven proposals were submitted to the program and these were evaluated by a panel of five reviewers.

Dr. Lindsay Triplett, with husband Preston and son Charles, welcomed their new daughter Veronica on October 20, 2018.
Mr. Ernesto Magaña Lopez and Ms. Mona Elamin will be working in the Department of Analytical Chemistry Laboratories for the first half of 2019. Ernesto is a graduate student from the Universidad Autónoma de Querétaro in Mexico and will be completing experiments related to his M.S. degree on the toxicity of mesoporous silica nanoparticles to pepper plants. Mona is a student from Gateway Community College and is completing an internship for her Environmental Science and Toxicology Course.

Mr. Darlan Ferreira Borges is a third year Ph.D. student at the Universidade Federal Rural do Semi-Árido (UFERSA) in Brazil. His internship at CAES will be from December 15, 2018 to July 15, 2019 under the guidance of Dr. Washington da Silva. He will work on the detection of viruses from symptomatic grapevine samples collected from several Connecticut vineyards during the summer and fall of 2018.
Mr. James Durrell
James has been working for Dr. Kimberly Stoner on a variety of bee projects during the summer of 2017 and again in 2018, continuing on into the winter. James has a B.A. in biology and a B.S. in English Literature from the University of Bridgeport. He currently works part-time at CAES. He is a part-time faculty member at the University of Bridgeport where he has had a variety of roles: teaching a seminar on Northeastern bees, developing laboratory exercises and manuals, and restoring the insect collection. He hopes to go to graduate school to continue his studies in insect ecology.

Ms. Jamie Cantoni
Jamie has been with the Station since the Spring of 2014, where she started her career as a mosquito trapper for the Center for Vector Biology and Zoonotic Diseases. She remained with the Station through the Spring of 2016 under the direction of the Department of Forestry and Horticulture, but left to pursue her passion for marine science, working for several zoos and aquariums in both Connecticut and Australia. Eventually, Jamie realized how much she missed the Station, and returned the Summer of 2018 to work in the Department of Entomology under Dr. Kirby Stafford III. In addition to handling ticks and bedbugs, Jamie is a volunteer Rescue Responder and in-house rescue clinic volunteer for Mystic Aquarium’s Animal Rescue Program, and hopes to progress further in the field of marine animal rescue and rehabilitation.

Mr. Zhichao Yang
Zhichao is a visiting student in the laboratory of Dr. Joseph J. Pignatello. He is a Ph.D. candidate at Nanjing University in Nanjing, China. He will be working on advanced oxidation processes for removal of pollutants in water based chelator-mediated Fenton-type reactions. His office is in room 312 of the Slate Building.
Ms. Jingjing Yang is a visiting student for a period of 12 months in the laboratory of Dr. Joseph J. Pignatello in the Department of Environmental Sciences. She is currently a PhD student at the School of Environment and Energy in South China University of Technology. Her research focuses on the development and testing of modified carbonaceous catalysts that can mediate the oxidation and degradation of organic pollutants in water.
The Connecticut Agricultural Experiment Station (CAES) prohibits discrimination in all of its programs and activities on the basis of race, color, religious creed, age, sex, marital status, veteran status, sexual orientation, gender identity, gender expression, national origin, ancestry, criminal conviction record, genetic information, learning disability, present or past history of mental disability, intellectual or physical disability, including, but not limited to blindness, of an applicant for employment or an employee, unless the mental disability or physical disability prevents adequate performance. To file a complaint of discrimination, contact Dr. Jason White, Vice Director, The Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven, CT 06504, (203) 974-8523 (voice), or Jason.White@ct.gov (e-mail). CAES is an affirmative action/equal opportunity provider and employer. Persons with disabilities who require alternate means of communication of program information should contact the Chief of Services, Michael Last at (203) 974-8442 (voice), (203) 974-8502 (FAX), or Michael.Last@ct.gov (e-mail).

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