Station News

The Connecticut Agricultural Experiment Station
Volume 7 Issue 2 February 2017

This Issue

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

CAES

The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

ADMINISTRATION

DR. THEODORE ANDREADIS presented information on the Station's mosquito and arbovirus surveillance program and results on West Nile virus in 2016 at a "Human Case Presentation" of the Yale Medical Group (January 4); attended the annual Connecticut Vegetable Growers Conference held in South Windsor (January 9); presided over a quarterly meeting of the Station's Board of Control held in Hartford (January 18); presented an update on Experiment Station activities at a meeting of the Experiment Station Associates Board of Directors (January 20); presented an overview of the Experiment Station and its various research, regulatory and public service programs the Annual Meeting of the Connecticut Tree Protective Association held in Plantsville (900 attendees) (January 19); and attended the annual meeting of the Connecticut Nursery and Landscape Association (January 25).

MS. VICKIE BOMBA-LEWANDOSKI attended and presented the CAES booth at the Connecticut Small Fruit and Vegetable meeting in South Windsor, Maneeley's Conference Center (January 9).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE attended the monthly Laboratory Preparedness meeting at the CT Department of Public Health Laboratory in Rocky Hill (January 9); testified at a hearing of the Commission on Human Rights and Opportunities (CHRO) where the CAES Affirmative Action Plan was reviewed and officially approved (January 11); along with **MR. JOSEPH HAWTHORNE, MR. CRAIG MUSANTE, MS. KITTY PRAPAYOTIN-RIVEROS, AND MS. TERRI ARSENAULT** participated in the monthly FDA FERN cCAP teleconference call (January 12); spoke by phone with Professor Leanne Gilbertson concerning collaborative research and a joint USDA grant proposal (January 12); participated in an APHL-sponsored teleconference call regarding a peer reviewed manuscript submission focused on nanotechnology and water treatment to the *Journal of the American Water Works Association* (JAWWA) (30 attendees) (January 9); attended the New Haven County Farm Bureau annual meeting at Lyman Hall High School (January 17); participated in an FDA FERN teleconference call focused on developing a standard protocol for sample handling and triage (January 18); presented an invited lecture entitled "Nanomaterials and the food supply: Assessing the balance between applications and implications" at the University of Connecticut Department of Pathobiology and Veterinary Science Seminar Series (30 attendees) (January 19); gave an invited seminar entitled "Nanomaterials and the food supply: Assessing the balance between applications and implications" by WebEx to the 11 universities that are part of the NSF-funded "Center for Sustainable Nanotechnology" (60 attendees) (January 20); along with **MS. TERRI ARSENAULT** and **MS. KITTY PRAPAYOTIN-RIVEROS** attended the annual FDA ISO Accreditation Manufactured Foods Regulatory Alliance Meeting in St. Petersburg, Florida (January 23-26); hosted a CAES Safety Committee webinar in chemical safety in the laboratory (80 attendees) (January 30); and gave an invited talk at the University of Nebraska Water Center seminar series entitled "Nanomaterials and the food supply: Assessing the balance between applications and implications" (January 31-February 1).

DR. BRIAN D. EITZER presented a talk on "Evaluating the Risk Pesticide Use Poses to Honey Bees" at the American Bee Research Conference (100 attendees) and attended the PI meeting for the multi-state hatch "Sustainable Solutions to Problems Affecting Bee Health" in Galveston, TX (January 12-13); and along with **MR. MICHAEL CAVADINI** and **DR. NUBIA ZUVERZA-MENA** participated in the FDA Agricultural Foods Regulatory Program Standards face to face meeting in Mobile, AL (January 18-19).

ENTOMOLOGY

DR. KIRBY C. STAFFORD III participated in a gypsy moth conference call with Connecticut and Rhode Island state foresters (January 31).

MS. KATHERINE DUGAS attended the CT Tree Protective Association Winter Meeting in Watertown, and staffed a CAPS and Forest Pest booth (January 19) and attended the CT Nursery and Landscape Association Winter Meeting in Watertown, and staffed a CAPS and Forest Pest booth (January 25-26).

MR. MARK H. CREIGHTON started preparations for the CT Queen Rearing Project with Dr. Richard Cowles at the Valley Laboratory in Windsor (January 4); continued working on Honey Bee/Nursery e-licensing program with other Inspectors and Dennis Geshel at CT DAS (January 6); attended the Apiary Inspectors of American annual conference in Galveston, TX (January 10); attended the American Beekeeping Federation annual convention in Galveston, TX (January 11-14); attended the American Association of Professional Apiculturists in Galveston, TX (January 12-13); presented a talk on Honey Bee Health at the 2017 Connecticut Beekeepers Association Bee School held in Jones Auditorium (108 attendees) (January 21); and continued to mentor an honors student research project on varroa mites and bee health at Woodbridge High School (January 27).

DR. CHRIS T. MAIER displayed specimens of the Spotted Lanternfly and distributed fact sheets about it at the Annual Meeting of the Connecticut Tree Protective Association in Plantsville (January 19).

DR. GALE E. RIDGE presented a talk to the Stratford and Bridgeport nurses associations and sanitarians about bed bugs in the schools (64 attendees) (January 13) and was interviewed by Eric Boodman of the Boston Globe at length about Delusory Parasitosis (January 27).

DR. CLAIRE E. RUTLEDGE attended the Connecticut Tree Protective Association winter meeting in Plainville (January 19) and presented a talk “Biosurveillance: using a native wasp to find an invasive beetle” to a Master Gardener class in Haddam (25 attendees) (January 31).

DR. VICTORIA L. SMITH participated in a meeting of the Yale Biosafety Committee, held at 135 College St., New Haven (20 participants) (January 19) and participated in the CT Nursery and Landscape Association Winter Symposium held at the Aqua Turf in Southington with a talk titled: Inspection, Registration, and Early Detection: Activities of the Office of the State Entomologist” (January 25).

DR. KIMBERLY A. STONER was interviewed by Nicole Rivard, reporter for Friends of Animals magazine, about research on bees (January 5) and was interviewed by Judy Benson of the New London Day about the pollinator health bill and bee research (January 10).

ENVIRONMENTAL SCIENCES

DR. PHILIP ARMSTRONG gave the lecture "An Overview and Survey of Arboviral Diseases" for the Biology of Disease Vectors course held at the Yale School of Public Health (8 student attendees) (January 25).

MR. GREGORY BUGBEE gave the talk "The Battle for Connecticut's Largest Lake – Controlling Eurasian watermilfoil with winter drawdown, weevils and grass carp" at the 2017 Northeast Aquatic Plant Management Society Conference in New Castle, NH (approximately 150 attendees) (January 1); with Jennifer Fanzutti gave a workshop on Invasive Aquatic Plants at the 2017 Envirothon in East Hartford (approximately 55 attendees) (January 14); and spoke to the Ajello's Pond Association in Seymour on "Controlling Aquatic Vegetation" (11 attendees) (January 18).

DR. JOHN SOGHIGIAN gave the talk "Bite-sized stories on container-dwelling mosquito ecology and evolution" in the Department of Ecology and Evolutionary Biology, Yale University (15 attendees) (January 23).

MR. JOHN SHEPARD attended an Executive Board Meeting of the Northeastern Mosquito Control Association held in Attleboro, MA (January 27).

FORESTRY AND HORTICULTURE

DR. JEFFREY S. WARD was interviewed about invasive shrubs, ticks, and Lyme disease by Laura Tangley of National Wildlife Magazine (January 9); spoke on "Right tree, Right place" at the Connecticut Tree Protective Association's 95rd Annual Meeting in Plantsville (400 attendees) (January 19); and spoke on "Compartimentación de la descomposición en los árboles: Porque hacemos la poda así" at the Connecticut Nursery & Landscape Association Winter symposium & Expo in Plantsville (29 attendees) (January 26).

DR. ABIGAIL A. MAYNARD attended the Connecticut Vegetable and Small Fruit Growers conference in South Windsor (January 9); assisted in planning learning garden at Hamden Hall Country Day School (4 teachers) (January 12,25); reported on station activities at a meeting of the State Technical Committee in Tolland (27 people) (January 18); reported on Station activities at a quarterly meeting of the Council on Soil and Water Conservation (15 people) (January 19); and talked about the New Crops Program at Rose's Berry Farm in Glastonbury (January 31).

DR. SCOTT C. WILLIAMS participated in a conference call for the Executive Board of the Northeast Section of The Wildlife Society (January 24) and attended the first meeting of the Advisory Board of the Environmental Science Program at Middlesex Community College, Middletown (January 25).

MR. JOSEPH P. BARSKY participated in the quarterly meeting of the New England Society of American Foresters Executive Committee in Concord, NH (January 11) and attended the Connecticut Tree Protective Association's 95rd Annual Meeting in Plantsville (January 19).

PLANT PATHOLOGY AND ECOLOGY

DR. WADE ELMER attended the Connecticut Vegetable and Small Fruit Growers meeting in South Windsor (January 9), attended the Pesticides and Roast Beef Meeting of the Connecticut Greenhouse Grower's Association and participated in the annual meeting (52 attendees) (January 19); visited Advanced Grow Laboratories in West Haven and met with the owner, David Lipton, and head growers and received a tour of the facility (January 24); and attended Ms. Cora McGehee's masters committee meeting in the Department of Plant Science at University of Connecticut in Storrs (January 31).

DR. YONGHAO along with **MS. LINDSAY PATRICK**, staffed the CAES booth at the Connecticut Tree Protective Association Annual Meeting in Plantsville (January 19).

MS. LINDSAY PATRICK attended the Connecticut Vegetable and Small Fruit Growers' Conference in South Windsor (January 9), helped staff a plant disease information booth at the Connecticut Tree Protective Association Annual Meeting in Plantsville (January 19), and attended the Connecticut Nursery and Landscape Association Winter Symposium and Expo in Plantsville (January 25).

VALLEY LABORATORY

DR. JATINDER S AULAKH attended the Northeastern Plant, Pest, and Soils Conference in Philadelphia, PA and presented a poster on "Tolerance of Container-grown Dogwood and Virginia Sweetspire to SP-1770 Herbicide" (January 3-6); attended the IR-4 meeting held in Philadelphia (January 5); and was interviewed by Growing Magazine regarding herbicide resistant weeds and their management (January 17).

DR. CAROLE CHEAH presented a talk on climate change influence on Hemlock Woolly Adelgid at the 2017 Winter Symposium and Expo of the Connecticut Nursery and Landscape Association in Southington (15 attendees) (January 25).

DR. RICHARD COWLES presented "Weevils wobble but don't fall down: Annual bluegrass weevil management," and "Neonics, bees, and trees," at the Ohio Turfgrass Foundation educational seminars in Columbus, OH (120 attendees) (December 7); presented "Neonics, bees, and trees," at the Valley Green educational seminars, Ledyard (100 attendees) (December 14); discussed "A Case Study for Tipping Point Dynamics: Neonics, Bees, Marketing, and Legislation," at the CT Vegetable and Small Fruit Growers' educational conference, South Windsor (275 attendees) (January 9); presented "Cyclical, Emerging and Disappearing Pests" to the New York Nursery and Turf Association educational conference, Yonkers, NY (January 11); talked about "Cyclical, Emerging and Disappearing Pests," at the SiteOne educational seminars in Darien and Cromwell (January 17 and 18, respectively, 200 attendees, total); presented "Neonics and bees," and "Neonicotinoid alternatives" at the CT Greenhouse Growers' Association educational conference, New Haven (60 attendees) (January 19); spoke on "Neonic update, and neonic alternatives" at Prides Corner Nurseries (40 attendees) (January 23); and presented "Cyclical, Emerging and Disappearing Pests" (150 attendees) and "Making the right choices" (100 attendees) at the CT Nursery and Landscape Association winter educational meeting, (January 25), Southington.

MS. ROSE HISKES gave a talk on "Insects: The Good, the Bad, the Beautiful and the Just Plain Ugly" to the New Haven Garden Club at the Jones Auditorium, CAES, New Haven (68 attendees) (January 9).

DR. JAMES LAMONDIA with **MS. ROSE HISKES** and **MS. DIANE RIDDLE** spoke about the Experiment Station, the Valley Laboratory and plant pathology research to Calvin Brodersen and (8 students) from the Rockville Agriculture Education Center (10 attendees) (January 4); presented a poster about 'Identification and management of the garlic bloat nematode *Ditylenchus dipsaci*' at the Connecticut Vegetable and Small Fruit Growers meeting held in South Windsor (273 attendees) (January 9) participated and spoke about research results and future projects during the CT Hop Growers Association meeting held at DeFrancesco Farm in Northford (55 attendees) (January 12); participated in the GLOBAL Globodera Alliance "Risk assessment and eradication of *Globodera* spp. in U.S. production of potato" annual advisory meeting held in Pocatello ID (20 attendees) (January 17); and participated in a planning meeting of the Connecticut Agricultural Information Council at the Valley Laboratory (January 18).

DEPARTMENTAL RESEARCH UPDATES JANUARY 2016

Zhao, Q.; Ma, C.; **White, J.C.**; Parkash Dhankher, O.; Zhang, X.; Zhang, S.; Xing, B. 2017. Quantitative evaluation of multi-wall carbon nanotube uptake by terrestrial plants. Carbon 114:661-670.

Abstract: The extent and mechanisms by which multi-wall carbon nanotubes (MWCNTs) are accumulated by terrestrial plant species is currently unknown. In this study, we successfully measured the MWCNTs content in different Arabidopsis thaliana tissues using 14C labeled MWCNTs in the presence of small polar aromatic organic molecules (SPAOMs), i.e. 1,4-dinitrobezene, 1,2-dinitrobenzene, 1,3-dinitrobenzene, nitrobenzene, 2,4-dichlorophenol, 2-chlorophenol and 4-chlorophenol. Both physiological (water loss, pigment content, and total protein content) and biochemical parameters (antioxidant enzyme activities) were measured in Arabidopsis co-exposed to 0.325 mM SPAOMs and 2.25 mg/L MWCNTs. Our results indicated that changes in biochemical parameters i.e. ascorbate peroxidase (APX), catalase (CAT) and superoxide dismutase (SOD) were much more sensitive than physiological parameters. The activities of antioxidant enzymes in the treatment with SPAOMs and MWCNTs was only 0.35-fold of that in the SPAOMs alone treatment, suggesting that MWCNTs could alleviate the toxicity to Arabidopsis. Due to the toxicity caused by SPAOMs, the MWCNTs uptake in the SPAOMs treatments was only 0.06-fold relative to the MWCNTs alone treatment, while hydration diameter of MWCNTs in solution did not significantly affect MWCNTs uptake by Arabidopsis. Uptake models for MWCNTs into root and leaf tissue were successfully constructed via stepwise multiple linear regression analysis. This is the first study that quantitatively correlates MWCNTs uptake with the toxicity of SPAOMs and the stability of MWCNTs, which will provide important information for the accurate determination of risk associated with CNT exposure.

Elmer, Wade H., **Peter Thiel**, and **Blaire Steven**. "Response of Sediment Bacterial Communities to Sudden Vegetation Dieback in a Coastal Wetland." *Phytobiomes* (2017): PBIOMES-09.

Abstract: The development of sudden vegetation dieback (SVD), which causes the rapid death of *Spartina alterniflora*, followed by no or slow recovery, has affected large-scale alterations in Atlantic coastal systems. This study reports the effects of the development of SVD on the sediment microbial communities. In 1999, Hammonasset Beach State Park in Connecticut experienced the initial appearance of SVD. After more than a decade, the plants have not recovered. Yet, sediment chemistry was similar between vegetated and SVD affected sites, with the exception of water loading, which was significantly higher in the SVD affected sites. Soil CO_2 flux, a proxy for soil respiration, was reduced by 64% in SVD sites compared to sites that remained vegetated. This suggests that SVD has affected large changes in carbon cycling in the wetland sediments. The microbial communities between vegetated and SVD sites were significantly different, as assessed by 16S rRNA gene sequencing. The vegetated sediments harbored significantly higher populations of Bacteroidetes related bacteria, whereas the SVD affected sediments contained a significantly enriched relative abundance of sulfate-reducing bacteria, predominantly within the genus *Desulfobulbus*. Thus, the development of SVD appears to favor anaerobic metabolic pathways at the expense of saprophytes. Greenhouse experiments testing if the alterations in the sediment microbial communities were associated with differences in *S. alterniflora* germination or growth were also pursued. Although small differences in growth and disease ratings were noted between seedling and transplants grown in soil mix (control), autoclaved SVD sediments, or non-autoclaved (natural) SVD sediments, mortality was not significantly different, indicating that the alterations in the sediment communities are not likely responsible for SVD, or a primary cause for the failure of *S. alterniflora* to recolonize the SVD sites.

Wang, Yixun, Chen Jingyuan, **Li De-Wei**, Zheng Lu, Huang Junbin 2017. *CglCUT1* gene required for cutinase activity and pathogenicity of *Colletotrichum gloeosporioides* causing anthracnose of *Camellia oleifera*. European Journal of Plant Pathology 147 (1): 103–114. DOI:10.1007/s10658-016-0983-x

Abstract: *Colletotrichum gloeosporioides* is the causal agent of *Camellia oleifera* anthracnose, mainly infecting fruits and leaves. The fungus secretes degrading enzymes to destroy the cuticle of aerial plant parts and help infect the host successfully. To validate whether a cutinase gene (*CglCUT1*) was required for cutinase activity and pathogenicity of *C. gloeosporioides*, the *CglCUT1* gene was cloned and analyzed.

The characterization of *CglCUT1* predicted protein suggests that the cloned DNA encoded a cutinase in *C. gloeosporioides* affecting *C. oleifera*. The *CglCUT1* showed a high homology to those from *C. gloeosporioides* causing papaya anthracnose and *C. capsici* causing pepper anthracnose, as well as those of other ascomycetes. The whole *CglCUT1* gene was knocked-out and the knockout mutant (Δ*CglCUT*39) was subsequently complemented using *Agrobacterium tumefaciens* mediated transformation. The knockout transformants exhibited significant decreases in cutinase activity and virulence compared with the wild-type strain. The complemented transformants of the disrupted transformant Δ*CglCUT*39 showed a significant increase in cutinase activity and virulence compared with the disrupted transformant Δ*CglCUT*39. This study suggests that the *CglCUT1* gene has a positive effect on fungal virulence of the hemibiotrophic *C. gloeosporioides* on *C. oleifera*.

JOURNAL ARTICLES APPROVED JANUARY 2016

Arango-Velez, Adriana, S. Chakraborty, B. Loftus, K. Blascyk, **J. Barsky**, L. Franzluebbers, and W. El Kayal. Changes in climate induced expansion range of Southern pine beetle to New England: a case study of Eastern white pine (*Pinus strobus*). *Canadian Journal of Forest Research*

Cowles, Richard S. When do we need to consider alternatives to neonics? *Proceedings of the NJ Ag Convention and Trade Show*

Eevers, N., **Joseph R. Hawthorne**, **Jason C. White**, J. Vangronsveld, and N. Weyens. Endophyte-enhanced phytoremediation of DDE-contaminated field soils using *Cucurbita pepo*. *International Journal of Phytoremediation*

Eitzer, Brian D., S. T. Garris, and J. M. Stevens. Introduction to the Special Issue: The 53rd North American Chemical Residue Workshop. *Journal of Agricultural and Food Chemistry*

Hsieh, Hsin-Se and **Joseph J. Pignatello**. Activated carbon-mediated base hydrolysis of alkyl bromides. *Applied Catalysis B: Environmental*

Krupke, C. H., J. D. Holland, E. Y. Long, and **Brian D. Eitzer**. Planting of neonicotinoid-treated maize poses risks for honey bees over a wide area with no consistent crop yield benefit. *Journal of Applied Ecology*

LaMondia, James A. *Pachysandra* species and cultivar susceptibility to the boxwood blight pathogen, *Calonectria pseudonaviculata*. *Plant Health Progress*

Maier, Chris. Recent range expansion into Connecticut by *Orocharis saltator* (Orthoptera: Gryllidae). *Journal of Entomological Science*

Ridge, Gale E., J. M. Sheele, et al. Xenointoxication of a rabbit using Ivermectin against the common bed bug, *Cimex lectularius* L. *Journal of Economic Entomology*

Shidore, Teja, J. S. Kirkwood, C. D. Broeckling, J. J. Long, B. Zhao, J. E. Leach, and **Lindsay R. Triplett**. The effector AvrRxo1 phosphorylates NAD in planta. *PLOS Pathogens*

Zhang, H., W. Chen, X. Shen, Y. Yang, **Jason C. White**, J. Lead, S. Tao, and X. Wang. Influence of multiwall carbon nanotubes and fullerene on the bioaccumulation and elimination kinetics of phenanthrene by geophagous earthworms (*Metaphire guillelmi*). *Environmental Science: Nano*

CAES

The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

The Connecticut Agricultural Experiment Station

Main Laboratories
123 Huntington Street
New Haven, CT 06511-2016
Phone: 203-974-8500

Lockwood Farm
890 Evergreen Avenue
Hamden, CT 06518-2361
Phone: 203-974-8618

Griswold Research Center
190 Sheldon Road
Griswold, CT 06351-3627

Valley Laboratory
153 Cook Hill Road
Windsor, CT 06095-0248
Phone: 860-683-4977

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.

Volume 7 Issue 2
February 2017

WWW.CT.GOV/CAES