

Station News

The Connecticut Agricultural Experiment Station
Volume 7 Issue 8 August 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.

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The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

ADMINISTRATION

DR. THEODORE ANDREADIS participated in a meeting of Connecticut's Invasive Plant Council held at the Valley Laboratory in Windsor (July 11); was interviewed about the first detection of West Nile virus in mosquitoes this season in West Haven by Renee Chmiel WTNH TV 8 (July 12); was interviewed about Plant Science Day 2017 by Ray Andrewsen WQUN AM 1220 in Hamden (July 25); and was interviewed about the detection of West Nile virus in four new Connecticut towns by Charlotte Liber, WSHU Public Radio (July 26).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE held a teleconference call with collaborators at NIST and several other institutions regarding preparation of a joint review article on measuring nanoparticle toxicity (July 3, 10); attended the 3rd Annual Parma Nano-Day at the University of Parma, in Parma Italy and gave a plenary lecture entitled "Nanomaterials and the food supply: Assessing the balance between applications and implications" (50 attendees) (July 11-15); along with **DR. BRIAN EITZER**, **DR. CHRISTINA ROBB**, **DR. WALTER KROL**, **MS. TERRI ARSENAULT**, **MR. CRAIG MUSANTE**, **MR. MICHAEL CAVADINI** and **MS. KITTY PRAPAYOTIN-RIVEROS** participated in the monthly FDA FERN cCAP teleconference call (July 13); and attended the 2017 International Conference on the Biogeochemistry of Trace Elements (ICOBTE) in Zurich, Switzerland and gave a keynote lecture entitled "Accumulation of engineered nanoparticles in terrestrial food chains: Correlating physiological and molecular response" (50 attendees) and a 2-minute "flash presentation" entitled "Nanoscale nutrients suppress plant disease and increase crop yield" (50 attendees) (July 16-20). Alongside **DR. NUBIA ZUVERZA-MENA**, **DR. ROBERTO DE LA TORRE-ROCHE** and **DR. CHUANXIN MA**, **DR. WHITE** mentored interns from the Southern Connecticut State University (SCSU) Plant Health Program as well as interns from the Center for Sustainable Nanotechnology.

DR. CHRISTINA ROBB attended a web presentation for a FDA FSMA call titled "The Office of Regulatory Affairs Aligns for the Future: An Overview of ORA's Office of Human and Animal Food Operations."

Dr. BRIAN EITZER was a participant in the quarterly phone call of the principal investigators for the Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture grant (July 12); participated in two phone calls with the PIs of the newly funded EPA project on Bumble Bees and Pesticide Exposure (July 17, July 28); and chaired a ses-

sion and presented a paper entitled “Collection and Analysis of Plant Nectar and Pollen and Honey Bee Collected Pollen at Ornamental Nurseries” at the 54th Annual North American Chemical Residue Workshop in Naples, FL (July 23-26).

ENTOMOLOGY

DR. KIRBY C. STAFFORD III was interviewed on the Chaz and AJ morning show on WPLR about ticks and Lyme disease (July 11); interviewed by Robert Miller, Danbury News Times, about tick activity (July 18); interviewed by David Scales, WBUR Boston, on Lyme disease trends and tick management (July 19); spoke on Lyme disease and tick control at the Public Library in Cheshire (17 attendees) (July 26).

MS. KATHERINE DUGAS staffed a Forest Pest table at the East Haddam Farmers’ Market (July 12); conducted an EAB lecture and tree walk for the Quinnipiac Valley Audubon Society at the Riverbound Farm Sanctuary in Cheshire (July 16); staffed a CAES table at the Connecticut Tree Protective Association summer meeting at Prides Corner Farm in Lebanon (July 20); and staffed a CAES table at the Connecticut Nursery and Landscape Association summer meeting at the Farmington Club in Farmington (July 26).

MR. MARK H. CREIGHTON was interviewed by the New Britain Herald on Honey bee health topics for an upcoming story (July 6); was awarded the Connecticut Wartime Service Medal by Governor Malloy and Commissioner Connolly from the Department of Veterans Affairs (July 20); attended a reorganization meeting of The Philomen J Hewitt Jr. Honeybee Museum and Research Center Inc. in Bethlehem (July 21). Philomen J. Hewitt was a past Bee Inspector at The Connecticut Agricultural Experiment Station and donated his estate and Honey bee collection, to be preserved for future beekeepers. The organization has been dormant for the past several years and we discussed several ideas on the best approach to move forward with this project.

DR. CHRIS T. MAIER was interviewed by Robert Miller of the Danbury New Times about deer and horse flies (July 5).

DR. GALE E. RIDGE was interviewed by Harlan Levy of the Journal Enquirer about why chipmunks and squirrels seem to be currently damaging tomatoes (July 24); Systematic Entomology Laboratory (SEL)-USDA confirmed the identification of *Lyctus africanus* as a new state record (July 31); and identified a spider found in China Girl blue holly bought from East Haven Home Depot by Lindsay Patrick (CAES) for display purposes to be a brown widow spider, *Latrodectus geometricus* (July 31). Trace-back revealed the holly had been grown in Havana, Florida, shipped up to Clinton Nurseries, and then delivered to the East Haven Home Depot for sale.

DR. CLAIRE E. RUTLEDGE held several training sessions for Wasp Watchers; at

the Norwalk River Parks & Fields, 12 Old Mill Rd, Wilton (7 adults) (July 6); at the Westbrook High School Fields, Westbrook (1 adult) (July 9); at the Thomas Edison Magnet School, 1355 North Broad Street, Meriden (5 adults) (July 10); at North Stonington Recreation, North Stonington (8 adults) (July 11); at Gideon Wells School, Glastonbury (1 adult) (July 12); and at Litchfield High School, Litchfield (4 adults) (July 12); and also hosted a visit from Dr. Hugh Evans and Dr. David Williams of UK Forestry and Dr. Gernot Hoch of the Austrian Research Centre for Forests to learn about emerald ash borer and bronze birch borer (see report below) (July 19-21).

DR. VICTORIA L. SMITH presented a talk to Experiment Station interns, directed by Lindsay Triplett, on inspection and registration at the Experiment Station (13 participants) (July 19); presented a talk to the Summer Meeting of the Connecticut Tree Protective Association, held at the Farmington Club in Farmington, titled “Forest Health—Insects and Diseases” (approx. 700 attendees) (July 20); and participated in a workshop, sponsored by US Forest Service and PA Department of Natural Resources, on Oak Wilt and Emerald Ash Borer, held at the Frick Environmental Center in Pittsburgh, PA (60 participants) (July 24-27).

DR. KIMBERLY A. STONER was interviewed on the WPKN radio program “The Organic Farmstand” by Bill Duesing and Guy Beardsley about bees, pollination, and pesticide exposure of bees (July 6).

Visit from PREPSYS Scientists

The Connecticut Agricultural Experiment Station hosted a visit from a group of scientists with PREPSYS (Pest Risk Evaluation and Pest Management Systems), July 19-July 21. This



Dr. Hugh Evans, a Senior Project Leader in Wales of UK Forest Research and Dr. Gernot Hoch, examine a purple prism trap hung on a birch tree at Lockwood Farm in Hamden with Dr. Claire Rutledge.



Dr. David Williams, an entomologist with UK Forest Research, learns how to spot a *Cerceris fumipennis* nest in Monroe, CT.

multi-partner project, headed by Forest Research UK, is focused on understanding how Europe can best prepare for, and manage if necessary, the risks and impacts of emerald ash borer (*Agilus planipennis*) and bronze birch borer (*Agilus anxius*). The group is funding preliminary research at CAES (Dr. Claire Rutledge) into adapting monitoring tools used for emerald ash borer for the detection of bronze birch borer. The bronze birch borer is native to North America, and non-North American species of birch have little-to-no resistance to the beetle. If bronze birch borer were to become established



in Europe, it could have a devastating impact. The scientists toured the Station, discussed invasive insects with Dr. Theodore Andreadis and Dr. Charles Vossbrinck, visited experimental trapping sites, helped to deploy parasitoids for emerald ash borer, collected emerald ash borer frass samples for training Austrian beetle-sniffing dogs, and discussed trapping and management of emerald ash borer with Dr. Melody Keena and Dr. Therese Poland of US Forest Service. They also had the opportunity to do some biosurveillance at a *Cerceris fumipennis* colony in Monroe and see first-hand the wasps bring in both emerald ash borers and bronze birch borers.

Dr. Gernot Hoch, Head of the Department of Forest Protection at the Austrian Research Centre for Forests, hangs a bolt containing emerald ash borer parasitoids at the Trout Brook Preserve in Weston, CT.

ENVIRONMENTAL SCIENCES

DR. PHILIP ARMSTRONG was interviewed by News Channel 3 about the mosquito trapping and testing program (July 3); and was interviewed by The CTPost, WTIC news radio, and News Channel 12 about the detection of West Nile virus in CT (July 11).

MS. ANGELA BRANSFIELD participated in the Federal Select Agent Program’s SAMS training webinar (July 11).

MR. GREGORY BUGBEE spoke to members of the Crystal Lake Association, Senator Len Suzio, and CTDEEP legislative liaison Lee Sawyer on “Control of Curlyleaf Pondweed” at 93 Lake Ridge Heights in Middletown (10 attendees) (July 20); spoke to the Bashan Lake Association on the 2016 CAES IAPP plant surveys of Bashan Lake and progress on control of phragmites and variable watermilfoil at the Old Town Hall in East Haddam (approx. 60 attendees) (July 26); and gave the talk “Connecticut’s Invasive Aquatic Plant Problem: The State of the State” at a meeting of the Friends of Bolton Lakes at the Newhoca Lodge in Vernon (approx. 60 attendees) (July 27).

DR. GOUDARZ MOLAEI was interviewed by the Connecticut Post on “Study: Lyme disease treatments surging” <http://www.ctpost.com/local/article/Study-Lyme-disease-treatments-surg-ing-11438365.php> (July 26).

FORESTRY AND HORTICULTURE

DR. JEFFREY S. WARD led an interpretative walk in Naugatuck State Forest (12 attendees) (July 15); attended the New England SAF silviculture northern hardwoods field trip in the Adirondacks (July 20-21); interviewed about barberry control and ticks by Anne Semmes of Greenwich Times (July 18); interviewed about barberry control and ticks by Shyang Puri of NBC-30 (July 24).

DR. ABIGAIL A. MAYNARD visited Bishop’s Farm in Guilford to discuss the New Crops Program with Keith Bishop (July 18).

DR. SCOTT C. WILLIAMS with **MS. MEGAN LINSKE**, hosted Trinity College post-doc Krista Ehlert and 2 undergraduates to demonstrate *Borrelia* detection via indirect fluorescent antibody staining technique (July 17); with **MS. MEGAN LINSKE**, gave a field demonstration on small mammal capture and handling techniques to students in the Natural Resources Conservation Academy at the University of Connecticut (12 students, 4 teachers) (July 21); met with Ms. Meredith VanAcker, Ph.D. student at Columbia University about white-tailed deer and blacklegged tick research (July 26); with **MS. MEGAN LINSKE** and **MR. MICHAEL SHORT**, was interviewed by NBC-30 Troubleshooters reporter Shyang Puri about the blacklegged tick and Japanese barberry relationship. (July 27).

Photos: Field demonstration on small mammal capture and handling techniques to students in the Natural Resources Conservation Academy at the University of Connecticut.



PLANT PATHOLOGY AND ECOLOGY

DR. WADE ELMER was visited by Ms. Natalie Hudson-Smith and Ms. Jaya Borgata from Universities of Minnesota and Wisconsin, respectively, who both participated in a collaborative project with **DR. JASON WHITE** using nanoparticle composites of copper and silicon to suppress plant disease (July 25-28); and participated in a data analysis exercise with the Plant Health Interns at Southern Connecticut State University (10 students) (July 28).

DR. YONGHAO LI presented “Spring and Summer Gardening Tips” to Olde Ripton Garden Club members in Shelton (35 adults) (July 10); staffed the CAES booth at the CTPA Summer Meeting in Farmington (July 20); was interviewed by Mr. Matthew Zabierek at the Record-Journal about growing palm trees in Connecticut (July 20); participated in the CTPA Arboriculture 101 course meeting and discussed continuous improvement of the arborist training program in Branford (July 24); and presented “Plant Disease Diagnostics” to the Summer Undergraduate Fellows in Plant Health and Protection program in New Haven (10 Adults) (July 26).

VALLEY LABORATORY

DR. RICHARD COWLES presented “Real facts about climate change: How should we prepare?” at the CT Tree Protective Association summer meeting in Farmington (170 attendees) (July 20).

ROSE HISKES gave a talk on “Insects: The Good, the Bad, the Beautiful and the just plain Ugly” at the Cheshire Library (22 attendees) (July 13).

DR. JAMES LAMONDIA conducted an oral exam for candidates for the Connecticut arborist license (July 10); attended and participated in the quarterly meeting of the Connecticut Hop Growers Association (July 12); and spoke about Integrated pest management of hops and conducted a tour of field plots as a part of the Connecticut Agricultural Experiment Station Hops Summer Meeting and Field Day held at the Valley Laboratory (25 attendees) (July 12).

DR. KATJA MAURER spoke about current hop research as part of the hop field meeting held at the Valley Laboratory (25 attendees) (July 12).

Hops Research Meeting Held at the Valley Laboratory

Twenty-five people attended the Connecticut Agricultural Experiment Station Hops Summer Meeting and Field Day held Wednesday, July 12, 2017 at the Valley Laboratory. CHGA President Alex DeFrancesco welcomed growers and spoke about current issues for the Hop Growers Association. Dr. Katja Maurer spoke about “hop culture and research results,” Jason Hoagland spoke about “Economic aspects of hop yard establishment” Dr. Jim LaMondia spoke about “Integrated pest management of hops” and Spencer Thrall spoke about “Barley production and malting.” Fred Behringer presented information on “Hop quality testing.” Talks were followed by question and answer tours of hop and barley field plots and demonstrations of the HopsHarvester combine and barley combine by Jim Preste. The meeting qualified for 3.25 pesticide applicator re-certification credits.

DEPARTMENTAL RESEARCH UPDATES JULY 2017

Schultes, N.P., Murtishi, B. and Li, D.W., 2017. Phylogenetic relationships of *Chlamydomyces*, *Harzia*, *Olpitrichum* and their sexual allies, *Melanospora* and *Sphaerodes*. *Fungal Biology*. <https://doi.org/10.1016/j.funbio.2017.07.004>

Abstract-Phylogenetic analyses using internal transcribed spacer (ITS), large subunit rRNA (LSU), and small subunit (SSU) sequence data showed that *Harzia*, *Chlamydomyces*, and *Olpitrichum* are con-generic. Thus, *Chlamydomyces*, and *Olpitrichum* were reduced to synonymy of *Harzia*. The generic concept was amended and expanded accordingly. Eight new combinations were proposed. *Melanospora* and *Sphaerodes* are phylogenetically related to *Harzia*. However, several members of *Melanospora* and *Sphaerodes* are polyphyletic and belong to Hypocreales or Microascales in Sordariomycetes. The *Proteophiala* morph is not only a crucial morphological character, but also has a phylogenetical significance in defining Melanosporales. It is hypothesized that the taxa with synanamorphic or asexual *Proteophiala* all belong to Ceratostomataceae, Melanosporales.

Zeng, Q., Wang, J., Bertels, F., Giordano, P.R., Chilvers, M. Huntley, R.B., Sundin, G., Vargas, J. M., and Yang, C.H. (2017) Recombination of virulence genes in divergent *Acidovorax avenae* strains that infect a common host. *Mol. Plant-Microbe Int.* <https://doi.org/10.1094/MPMI-06-17-0151-R>

Abstract-Bacterial etiolation and decline (BED), caused by *Acidovorax avenae*, is an emerging disease of creeping bentgrass on golf courses in the United States of America. We performed the first comprehensive analysis of *A. avenae* on a nationwide collection of turfgrass and maize pathogenic *A. avenae*. Surprisingly, our results reveal that the turfgrass pathogenic *A. avenae* in North America are not only highly divergent but also belong to two distinct phylogroups. Both phylogroups specifically infect turfgrass but are more closely related to maize pathogens, than to each other. This suggests that although the disease is only recently reported it has likely been infecting turfgrass for a long time. To identify a genetic basis for the host specificity we searched for genes closely related among turfgrass strains but distantly related to their homologues from maize strains. We found a cluster of 11 such genes generated by three ancient recombination events within the Type III Secretion System (T3SS) pathogenicity island. Ever since the recombination, the cluster has been conserved by strong purifying selection hinting at its selective importance. Together our analyses suggest that BED is an ancient disease that may owe its host specificity to a highly conserved cluster of 11 T3SS genes.

Zhang, H.; Chen, W.; Shen, X.; Yang, Y.; White, J.C.; Lead, J.; Tao, S.; Wang, X. 2017. Influence of multiwall carbon nanotubes and fullerene on the bioaccumulation and elimination kinetics of phenanthrene by geophagous earthworms (*Metaphire guillelmi*). *Environ. Sci.: Nano* DOI: 10.1039/C7EN00118E.

Abstract-The impact of multiwalled carbon nanotubes (outer diameters < 8 nm: MW8; > 50 nm: MW50) and fullerene (C60) at 300 or 3000 mg kg⁻¹ on phenanthrene bioaccumulation and elimination kinetics (L, 1.37 mg kg⁻¹; H, 16.14 mg kg⁻¹) by a geophagous earthworm (*Metaphire guillelmi*) was investigated. Prior to worm exposure, the residual phenanthrene concentrations in soil decreased by 56.4% (L) and 59.9% (H) after 12 h equilibrium. Only 14.4% (L) and 27.9% (H) of phenanthrene could be extracted with β -HPCD. Phenanthrene accumulation in earthworms exhibited a bell-shaped pattern for all treatments. However, both the rate and extent of bioaccumu-

lation and elimination by earthworms were significantly affected by the CNMs amendment, depending on their type and concentration. C60 and MW8 at 300 mg kg⁻¹ in the L system significantly decreased the uptake rate of phenanthrene, resulting in a delayed maximum accumulation at 2 d. All other treatments had little impact on uptake rate except a slight decrease induced by MW8 at 3000 mg kg⁻¹. The maximum phenanthrene accumulation followed an order of C60 > MW8 > MW50 at a given amendment level of these materials. All CNMs increased phenanthrene uptake rates by earthworms in the H system except for MW8 at 3000 mg kg⁻¹, with the maximum accumulation occurring earlier than the control. Furthermore, the phenanthrene uptake rate in earthworms followed an order of C60 > MW50 > MW8 at a given amendment level, which is reverse the analytes sorption strength to these materials. Interestingly, phenanthrene bioaccumulation in the H system amended with 3000 mg kg⁻¹ MW8 was 2.2-3.9 times that of all other treatments at 35 d. For elimination, MW8 at this level increased the phenanthrene remaining in earthworms in both L (1.4-3.2 times) and H (1.1-15.2 times) systems. A higher burden of phenanthrene during the later bioaccumulation and elimination periods could result from ingestion and absorption of MW8; the accumulated phenanthrene may strongly bind to the internalized MW8, thereby reducing its elimination. Soil amendment with C60 and MW50 at both levels and MW8 at 300 mg kg⁻¹ increased phenanthrene elimination in the L system, while that in H system was not significantly affected. The results highlight the impact of CNMs on the bioaccumulation and elimination kinetics of phenanthrene in a typical geophagous earthworm, and provides important information for understanding the potential risks of CNMs release into terrestrial systems.

Ma, C.; Liu, H.; Chen, G.; Zhao, Q.; Eitzer, B.; Wang, Z.; Cai, W.; Newman, L.A.; White, J.C.; Dhankher, O.; Xing, B. 2017. Effects of titanium oxide nanoparticles on tetracycline accumulation and toxicity in *Oryza sativa* (L.). *Environ. Sci.: Nano.* 10.1039/C7EN00280G.

Abstract—Although both antibiotic residues and metal-based nanoparticles (NPs) are common emerging pollutants, little is known about their potential co-contaminant interactions, including resulting impacts on sensitive biota such as food crops. This study assessed the impact of tetracycline (TC, 5 - 20 mg/L) and titanium dioxide (TiO₂, 500 - 2000 mg/L) NPs co-exposure on *Oryza sativa* L. (rice) under a 10-d hydroponic exposure. Plant biomass, contaminant content (TC, Ti), oxidative stress enzymes, and macro-/micronutrient contents were measured in rice shoots and roots as a function of exposure. Under TC alone exposure, dose-dependent toxicity (biomass, oxidative stress enzymes) and TC accumulation were observed and the levels of several key elemental nutrients were decreased. For example, root biomass treated with 5 and 20 mg/L TC was reduced by 18.8% and 62.5%, respectively, relative to the control. The content of K, P, and S in 10 and 20 mg/L TC treated rice shoots were approximately 80% of the unamended control. Under co-exposure, the presence of TiO₂ NPs significantly enhanced the TC treated rice growth in terms of plant size and total biomass. In addition, TiO₂ NPs significantly reduced the levels of TC in rice shoots and roots, as well as oxidative stress enzymes, back to the level of unamended controls and also enabled recovery of TC-induced nutrient deficiency. It is worth mentioning that both contaminants resulted in severe iron deficiency (44 - 76% decreases of Fe in all the treatments were evident) under both single and co-exposure treatments. Abiotic sorption data indicates that TC phytotoxicity was prevented due to sorption of the antibiotic onto NP TiO₂ (a maximum amount was 2.62 mg/g), resulting in significantly decreased availability to the rice seedlings. Antagonistic and synergistic effects of TiO₂ NPs and TC on rice were analyzed using three methods, including toxicity unit (TU), additional index (AI), and mixture toxicity index (MTI), all of which indicated under co-exposing condition, TiO₂ NPs and TC interacted antagonistically, resulting in an overall alleviation of phytotoxicity and enhanced plant health.

JOURNAL ARTICLES APPROVED JULY 2017

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STATION NEWS

Alexander, Candice, Douglas W. Dingman, George S. Mourad, and Neil P. Schultes. The solute transport profile of two Aza-guanine transporters from the Honeybee pathogen *Paenibacillus larvae*. *FEMS Microbiology Letters*

Bhattacharyya, S., J. Bennett, L. C. Short, T. S. Theisen, M. D. Wichman, Jason C. White, and S. Wright. Nanotechnology in the water industry: Part 1 - Occurrence and risks; Part 2 - Toxicology and analysis. *Journal of the American Water Works Association*

Elmer, Wade H., Roberto De La Torre-Roche, Luca Pagano, Sanghamitra Majumdar, Nubia Zuverza-Mena, Christian Dimkpa, Jorge Gardea-Torresdey, and Jason C. White. Effect of foliar application of metallic oxide nanoparticles on Fusarium wilt of watermelon. *Plant Disease*

LaMondia, James A., R. L. Wick, and N. A. Mitkowski. Plant parasitic nematodes of New England - Connecticut, Massachusetts and Rhode Island. Chapter 3 in *Plant Parasitic Nematodes in Sustainable Agriculture in North America*, S. A. Subbotin and J. J. Chitambar, editors. Springer Publishers.

Ma, Chuanxin, H. Liu, G. Chen, Q. Zhao, Brian D. Eitzer, Z. Wang, W. Cai, L. A. Newman, Jason C. White, O. Dhankher, and B. Xing. Effects of titanium oxide nanoparticles on tetracycline accumulation and toxicity in *Oryza sativa* (L.). *Environmental Science: Nano*

Stafford III, Kirby C. Prevention of ticks and tick-associated disease in companion animals. *CAES Fact Sheet*

Stoffer, Amanda J., Douglas W. Dingman, George S. Mourad, and Neil P. Schultes. Functional characterization of the uracil transporter from the Honeybee pathogen *Paenibacillus larvae*. *Archives of Microbiology*

NEW STAFF AND STUDENTS JULY 2017



MS. ALYSHA AUSLENDER, a Master's student in biology with Dr. Rebecca Silady at SCSU, will be supervised by **DRS. MARRA** and **ELMER** in a project exploring the genetic diversity of *Fusarium palustre*, a pathogen of *Spartina alterniflora* associated with Sudden Vegetation Dieback in eastern salt marshes.



DR. GILLIAN EASTWOOD has joined the staff of the Center for Vector Biology & Zoonotic Diseases and the Department of Environmental Sciences as a Postdoctoral Research Scientist. Gillian is a native of the United Kingdom and earned her PhD in Conservation/Disease Ecology at the University of Leeds & Zoological Society London, UK. She recently completed postdoctoral studies on the ecology of Hantavirus at the University of Tennessee and investigations on enzootic arboviruses at the Kenya Medical Research Institute in Nairobi. She will be working with **DR. THEODORE ANDREADIS** and **DR. PHILIP ARMSTRONG** on the ecology and behavior of invasive mosquitoes and evaluate novel trapping methods for monitoring mosquito populations and their viral pathogens as part of the Northeast Regional Center of Excellence in Vector-Borne Diseases.



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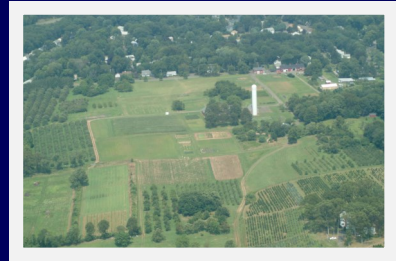
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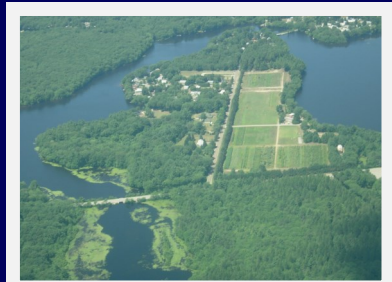
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Griswold Research Center
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Griswold Research Center, Griswold



Valley Laboratory, Windsor

Valley Laboratory
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