STATION NEWS

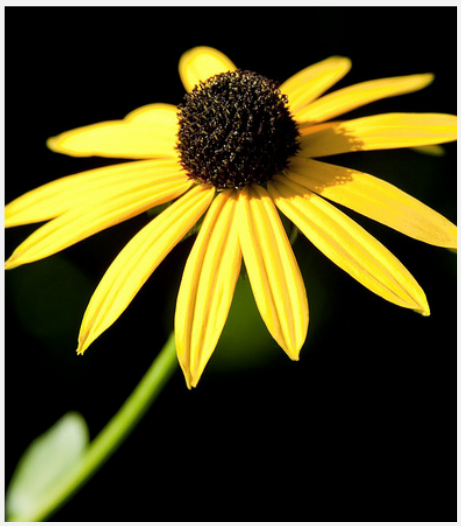
The Connecticut Agricultural Experiment Station

CAES

The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

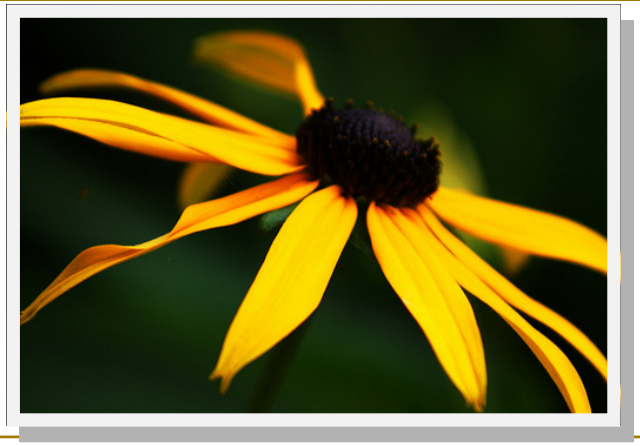
The mission of The Connecticut Agricultural Experiment Station is to develop, advance, and disseminate scientific knowledge, improve agricultural productivity and environmental quality, protect plants, and enhance human health and well-being through research for the benefit of Connecticut residents and 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.



VOLUME 5, ISSUE 6

JUNE 2015

Departmental News



DEPARTMENTAL NEWS

ADMINISTRATION

DR. THEODORE ANDREADIS presented opening remarks and a talk entitled *Chikungunya Virus in the Americas: Are We at Risk?* in a workshop on "Public Health Research and Services at the Connecticut Agricultural Experiment Station" for State and local public health officials held in Jones Auditorium (50 attendees) (May 7); presented opening remarks and a talk entitled *Chikungunya Virus in the Americas: Assessing Our Risk* at the 6th Annual Northeastern Eastern Equine Encephalitis Conference held at the Station (40 attendees) (May 17); was interviewed by Sabrina Tavernise, Health Reporter for the The New York Times on the impact of climate change on the distribution and potential impact of the exotic invasive mosquito, *Aedes albopictus* (May 22); and was interviewed about the outlook for mosquitoes and West Nile virus for the 2015 season by Amanda Cuda, Connecticut Post, and Fran Schneido WCBS Radio New York (May 28).

DEPARTMENTAL NEWS

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE attended the monthly Laboratory Preparedness Advisory Committee meeting at the Department of Public Health Laboratory in Rocky Hill CT (May 4); gave a presentation entitled "Food Safety and Public Health" at the Public Health Research and Services Symposium in Jones Auditorium at CAES (May 6); along with **DR. BRIAN EITZER, DR. CHRISTINA ROBB, DR. WALTER KROL, DR. SANGHAMITRA MAJUMDAR, DR. ARNAB MUKERJEE, MS. KITTY PRAPAYOTIN-RIVEROS, MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, MR. CRAIG MUSANTE, AND MS. TERRI ARSENAULT** participated in the FDA FERN cCAP monthly teleconference call (May 14); participated in a teleconference call with collaborators from Carnegie-Mellon University and Duke University to begin organizing a conference that has been funded by NSF is entitled "FEW Workshop for Applying Sustainable Nanotechnology to Optimize and Unify Food, Energy and Water Systems" (May 22); along with **DR. BRIAN EITZER** participated in the bimonthly Northeast Regional FERN teleconference call (May 28); and along with **DR. CHRISTINA ROBB, DR. WALTER KROL, MS. KITTY PRAPAYOTIN-RIVEROS, MR. MICHAEL CAVADINI, MR. JOHN RANCIATO, AND MS. TERRI ARSENAULT** participated in a bimonthly FDA ISO Accreditation Mentor-Mentee teleconference call with the Ohio Department of Agriculture (May 28).

Dr. BRIAN EITZER talked to and was quoted by Greg Hladky of the Hartford Courant for a story on bees and pesticides that was in the May 25 edition of the paper, participated in several conference calls about an LC-MS class he will be teaching for the FDA (May 4, 6, 20, 26); and participated in the North American Chemical Workshop's Organizing Committee phone call (May 21).

MR. MICHAEL J. CAVADINI presented information about the field of analytical chemistry and CAES's work in nanoparticle research to students at the North Branford High School Environmental Science Fair (~30 student/5 adult attendees)(May 22).

DR. CHRISTINA ROBB attended a board meeting of the Eastern Analytical Symposium on by phone (May 1).

ENTOMOLOGY

DR. KIRBY C. STAFFORD III, with **DR. CLAIRE RUTLEDGE** speaking on the emerald ash borer, presented a talk on ticks and tick management at the Connecticut Audubon Society Center in Ridgefield as part of their master naturalists program followed by a field excursion to tag ash trees and collect ticks (May 5); spoke about tick control at the Public Health Research and Services Symposium in Jones Auditorium (60 attendees) (May 6); was visited by Chuck Lubelczyk, Maine Medical Center Research Institute, to discuss our tick overwintering study funded by the NE-IPM Center (May 11); was interviewed about the upcoming tick season by Mark Sims, Connecticut Radio Network (May 11); presented a talk on biorational and ecological strategies for tick control for the Duchess County Tick Task Force Webinar (May 13); **with DR. PHILIP ARMSTRONG**, was interviewed about ticks and the upcoming tick season by Sam Gingerella, WTIC-Radio (May 14); was interviewed about mosquitoes by Kari Niiri, New England Public Radio (May 21); and with **DR. KIMBERLY STONER**, was interviewed about bees and the President's new proposed national pollinator health strategy by Jim Altman, Fox CT News (May 26).

MR. MARK H. CREIGHTON set up a table and spoke about bees, pollination, and beekeeping at Farm City held at Common Ground High School in New Haven (spoke to 200 youths) (May 8); spoke about bees and pollination and displayed an observation hive at ConnJam 2015, a meeting of all Boy Scouts in Connecticut, held at the Orange Fairgrounds (May 16); was interviewed about honey bee losses in Connecticut by the Waterbury Republican-American (May 21); was interviewed about bee losses in Connecticut by the Hartford Courant for an article that appeared on the front page on Memorial Day (May 22); and spoke about honey bee health and the role honey bees play in pollination at Save the Bees Day in Columbia (100 attendees) (May 23).

DR. DOUGLAS W. DINGMAN served as a judge for the Connecticut FFA Science Fair in Southington (May 7); presented a talk titled "Honey Bee Basics" to the Branford Garden Club in Branford (May 11); served as a judge for the New Haven Science Fair in New Haven (May 12); and conducted an all-day workshop on "Nosema monitoring" for the Backyard Beekeepers Association in Jones Auditorium (May 16).

MS. KATHERINE D. DUGAS, with **MR. MARK H. CREIGHTON**, staffed a table with forest pest and honey bee information at the Boy Scouts ConnJam 2015 event held at the Orange Fairgrounds (May 16); and with **SANDRA ANAGNOSTAKIS**, **MR. JOSEPH P. BARSKY**, and **DR. ROBERT MARRA**, staffed tables with information about CAES, chestnuts, plant pathology, and forest pests at the Connecticut Tree Festival in Norwalk (May 16).

DR. CHRIS T. MAIER exhibited historical Connecticut maps and live insects at the Annual Dinner Meeting of the Connecticut Entomological Society in Jones Auditorium (May 15).

DR. CLAIRE E. RUTLEDGE spoke about the emerald ash borer at the Connecticut Audubon Society Center in Ridgefield as part of their master naturalists program (May 5); was interviewed about Southern pine beetle by Judy Benson of The Day (May 29), resulting in the article "Southern Pine Beetle Found Invading All Corners of State," which ran on June 1, 2015.

http://www.theday.com/article/20150530/NWS01/150539946.

DR. VICTORIA L. SMITH participated in a meeting of the Yale Biosafety Committee in New Haven (20 participants) (May 21).

DR. KIMBERLY A. STONER visited Thalberg and Strong Elementary Schools in Southington with the principals of the schools and the maintenance staff to collect and identify bees nesting in aggregations on the grounds of the two schools (May 22); was interviewed about the current status of bees in Connecticut and the White House Strategy for Pollinator Health by Mike Puffer of the Waterbury Republic-American (May 22) and by Greg Hladky of the Hartford Courant (May 22); spoke on "Keeping the Bees" at a program sponsored by the Connecticut Farm Bureau and the Agricultural Commissions of the towns of Ashford, Coventry, Mansfield, Tolland, and Windham, at Knowlton Memorial Hall in Ashford (39 attendees) (May 26); and with **DR. KIRBY STAFFORD**, was interviewed about bees and the White House Strategy for Pollinator Health by Jim Altman of Fox CT News (May 28).

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO gave the talk "Adsorption of Polar and Ionic Compounds to Pyrogenic Carbonaceous Materials" and co-authored a poster "Bioacessibility of PAHs in Fuel Soot Assessed by an *in vitro* Gastrointestinal Model Including a Third-phase Absorptive Sink: Effect of Food Ingestion" at the Society of Environmental Toxicology and Chemistry, Europe Annual Meeting in Barcelona, Spain (approximately 250 attendees) (May 3-7); and attended the annual meeting of the Connecticut Academy of Science and engineering (CASE) in Cromwell (May 19).

DR. PHILIP ARMSTRONG presented the talk "Surveillance for Mosquito Borne Viruses" at the Public Health Entomology Symposium organized by the Connecticut Agricultural Experiment Station, New Haven (100 Attendees) (May 6); presented the talk "EEE virus in Connecticut: Lessons Learned from 18 Years of Surveillance and Research" at the 6th Annual Northeastern EEE Virus Conference organized by The Connecticut Agricultural Experiment Station and Centers for Disease Control and Prevention, New Haven (50 attendees) (May 8); and was interviewed about Mosquitoes and Mosquito-borne Diseases in Connecticut by Sam Gingerella at WTIC radio (May 14).

DR. DOUG BRACKNEY gave an invited talk "Elucidating the dynamic interplay West Nile virus and mosquito innate immunity" at Baylor Medical College (approximately 15 attendees) (May 15).

MR. GREGORY BUGBEE participated as an invasive aquatic plant science advisor at the 2015 Wamago Regional High School Science Project Presentation Day in Litchfield (approximately 100 attendees)(May 12); and spoke at a meeting of the Fence Rock Lake Association in Guilford on "CAES IAPP Research Update on Control of Brazilian Waterweed in Fence Rock Lake " at the Guilford Community Center (approximately 25 attendees)(May 6).

DR. GOUDARZ MOLAEI organized a symposium entitled, "Public Health Research and Services" at the CAES in coordination with the Connecticut Department of Public Health and health departments from throughout the State and presented a talk on "Tick Research and Diagnostic Services" (approximately 55 attendees) (May 6); and helped organize the Annual Northeastern Eastern Equine Encephalitis Virus Conference at the CAES in collaboration with the CDC and presented the talk "Dynamics of Vector-Host Interaction and Emergence of Eastern Equine Encephalitis in the Northeastern USA" (approximately 40 attendees) (May 8).

MR. JOHN SHEPARD met with members of the Vermont Agency of Agriculture and the Vermont Department of Health to discuss the Connecticut Mosquito Arbovirus Surveillance Program and the processing of mosquitoes for identification, submission for virus testing, and data management (May 7).

MR. MICHAEL THOMAS led a bird walk for the Hartford Audubon Society at Bartholomew's Cobble, Ashley Fall MA (14 participants) (May 9).

DR. CHARLES VOSSBRINCK visited colleagues in Chongqing, China; presented two lectures on phylogenetic analysis and taxonomy (15 attendees at each lecture); advised graduate students at the University of Southwest China and at Chongqing Normal University; and presented information about the Connecticut Agricultural Experiment Station, the State of Connecticut, and the USA to a class of 10th grade high school students (40 attendees) (May 21-31).

FORESTRY AND HORTICULTURE

DR. JEFFREY WARD spoke on careers in natural resources to students from Lyman Hall (10 students, 1 teacher) (May 11); spoke on "A short history of Connecticut's forests" for the Burlington Historical Society (17 attendees) (May 14); along with **DRS. ADRIANA ARANGO, JAMES LaMONDIA**, and **CAROLE CHEAH,** with **MS. JENNIFER FANZUTTI** hosted an exhibit on innovative research by the Station in the Capitol Corridor in Hartford (May 27); interviewed about black locust flowering by Chris Mascaro of the Danbury News-Times (May 28); spoke on "Tree and shrub identification" for the Master Gardeners in Norwich (9 attendees) (May 29); and interviewed about roadside forest management by Judy Benson of the New London Day (May 29).

DR. ADRIANA ARANGO VELEZ participated in the Ninth Annual Connecticut Tree Festival at Cranbury Park in Norwalk where she displayed of samples for southern pine beetle collected in Connecticut (100 attendees) (May 16).

DR. ABIGAIL MAYNARD worked with environmental science students with their projects at Hamden Hall Country Day School (2 teachers, 16 students) (May 6); and talked about careers in agricultural to biology students at Hamden Hall Country Day School (2 teachers, 52 students) (May 21).

DR. SCOTT WILLIAMS hosted the St. Thomas's Day School first grade class on a tour of CAES which included presentations by **DR. GALE RIDGE, MR. MARK CREIGHTON, MS. JENNIFER FANZUTTI**, and **MR. PETER THEIL** (20 students, 5 teachers) (May 6).

MR. JOSEPH P. BARSKY led a forest ecology and Spring wildflower hike for the Guilford Land Trust (8 people) (April 25); evaluated Middletown High School ASTE Program as member of State Consulting Committee for Agricultural Science and Technology Education (June 4 & 11); attended of State Consulting Committee for Agricultural Science and Technology Education at Bloomfield High School (May 5); served as a panel judge for the ASTE Agriscience Fair at Southington High School (May 7); staffed a CAES booth at the Connecticut Tree Festival at Cranberry Park in Norwalk (May 16); and staffed a forestry and natural resources booth at the North Branford High School Career Day Event (May 22).

PLANT PATHOLOGY AND ECOLOGY

DR. SANDRA L. ANAGNOSTAKIS joined two members of the Fairfield garden club and two men from the Fairfield Conservation Commission to examine the 10 open-space sites where 100 CAES chestnut trees were planted in 2012. Deer fencing was provided by the town of Fairfield. Survival of the trees was 40%, in spite of heavy competition from invasive plants. Asian bittersweet and Japanese knotweed were abundant in 5 of the sites, and Conservation staff have been mowing as often as possible. Replacement trees from the CAES chestnut breeding program will be planted in 2016 (May 26).

DR. WADE H. ELMER attended an appreciation luncheon for collaborating scientists and instructors at the University of New Haven (May 6); and participated as a judge for the AgriScience fair at Southington High School (May 7).

DR. ROBERT E. MARRA attended a bioinformatics training workshop in Raleigh, NC (May 18-23); gave a presentation at the Childs Center at Great Mountain Forest, in Falls Village, on nondestructive tree assessment using tomography, called "CAT Scans for Trees." The 1-hour presentation was followed by a 30-minute demonstration of both Sonic Tomography and Electrical Resistance Tomography (May 30).

VALLEY LABORATORY

DR. CAROLE CHEAH was interviewed by Patrick Skayhill of WNPR, Connecticut Public Radio, on the effects of the 2014-2015 winter on populations of hemlock woolly adelgid in Connecticut, (May 8).

DR. JAMES LAMONDIA answered questions about Station activities and research while manning a display at the Capital Corridor (May 27).

DEPARTMENTAL RESEARCH UPDATES MAY 2015

Nathan D. Grubaugh1, Darci R. Smith1, **Doug E. Brackney**, Angela M. Bosco-Lauth, Joseph R. Fauver, Corey L. Campbell, Todd A. Felix, Hannah Romo, Nisha K. Duggal, Elizabeth A. Dietrich, Tyler Eike, Jennifer E. Beane, Richard A. Bowen, William C. Black, Aaron C. Brault, Gregory D. Ebel.Experimental Evolution of an RNA Virus in Wild Birds: Evidence for Host-Dependent Impacts on Population Structure and Competitive Fitness. *PLoS Pathog.* 11(5):e1004874 (2015). doi: 10.1371/journal.ppat.1004874.

ABSTRACT: Within hosts, RNA viruses form populations that are genetically and phenotypically complex. Heterogeneity in RNA virus genomes arises due to error-prone replication and is reduced by stochastic and selective mechanisms that are incompletely understood. Defining how natural selection shapes RNA virus populations is critical because it can inform treatment paradigms and enhance control efforts. We allowed West Nile virus (WNV) to replicate in wild-caught American crows, house sparrows and American robins to assess how natural selection shapes RNA virus populations in ecologically relevant hosts that differ in susceptibility to virus-induced mortality. After five sequential passages in each bird species, we examined the phenotype and population diversity of WNV through fitness competition assays and next generation sequencing. We demonstrate that fitness gains occur in a species-specific manner, with the greatest replicative fitness gains in robin-passaged WNV and the least in WNV passaged in crows. Sequencing data revealed that intrahost WNV populations were strongly influenced by purifying selection and the overall complexity of the viral populations was similar among passaged hosts. However, the selective pressures that control WNV populations seem to be bird species-dependent. Specifically, crow-passaged WNV populations contained the most unique mutations (~1.7× more than sparrows, ~3.4× more than robins) and defective genomes (~1.4× greater than sparrows, ~2.7× greater than robins), but the lowest average mutation frequency (about equal to sparrows, ~2.6× lower than robins). Therefore, our data suggest that WNV replication in the most disease-susceptible bird species is positively associated with virus mutational tolerance, likely via complementation, and negatively associated with the strength of selection. These differences in genetic composition most likely have distinct phenotypic consequences for the virus populations. Taken together, these results reveal important insights into how different hosts may contribute to the emergence of RNA viruses.

Feng Xiao and **Joseph J. Pignatello**,* Interactions of triazine herbicides with biochar: Steric and electronic effects, *Water Research*, 80, 179-188 (2015).

ABSTRACT: We studied the adsorption of triazine herbicides and several reference heteroaromatic amines from water onto a temperature series of hardwood biochars (300 – 700 oC, labelled B300 – B700). Adsorption on biochars correlated poorly with pyrolysis temperature, H/C, O/C, mean minimum fused ring size, surface area (N2 or CO2), microporosity, and mesoporosity, but correlated well with a weighted sum of microporosity and mesoporosity. Steric effects were evident by the negative influence of solute molecular volume on adsorption rate. Adsorption rate maximized for the biochar with the greatest mesoporosity-to-total-porosity ratio, suggesting that mesopores are important for facilitating diffusion into pore networks. The cationic forms of amines adsorb more slowly than the neutral forms. To further probe steric and electronic effects, adsorption on a biochar (B400) was compared to adsorption on graphite—a nonporous reference material with an unhindered, unfunctionalized graphene surface—and in comparison with reference compounds (benzene, naphthalene, pyridine, quinoline and 1,3-triazine). Relative to benzene, the surface area-normalized adsorption of the triazine herbicides was disfavored

on B400 (favored on graphite) by 11−19 kJ/mole, depending on concentration. It is estimated that steric suppression of B400 adsorption comprises 6.2 kJ/mol of this difference, the remainder being the difference in polar electronic effects. Based on the behavior of the reference amines, the difference in polar effects is dominated by π−π electron donor–acceptor (EDA) interactions with sites on polyaromatic surfaces, which are more electropositive and/or more abundant on graphite. Overall, our results show that mesoporosity is critical, that adsorption rate is a function of solute molecular size and charge, that steric effects in the solute largely suppress equilibrium adsorption, and that π−π EDA forces play a role in triazine polar interactions with the biochar.

LaMondia, J. A. 2015. Fusarium wilt of tobacco. *Crop Protection* 73:73-77.

ABSTRACT: Fusarium wilt of tobacco is widespread in tobacco growing regions of the world and can cause significant losses in yield and quality. The pathogen is quite variable, with different pathogenicity and host ranges associated with *forma speciales* and lineages from tobacco and sweet potato or cotton. At least 4 groups have been described, including *F. o.* f. sp. *vasinfectum* from cotton, one that includes all isolates originally recovered from tobacco (*F. o.* f. sp. *nicotianae*), and two *F. o.* f. sp. *batatas* groups with different pathogenicity to flue-cured tobacco or wilt-resistant sweet potato. In addition, a new species has recently been described causing wilt of flue-cured tobacco in China. The Fusarium wilt pathogen has the potential to spread quickly, and can be associated with tobacco seed. In experiments conducted in Connecticut, the fungus was present both inside and on the exterior of the seed and can account for the rapid spread of the pathogen between farms, states and even between countries. The wilt pathogen can interact with plant parasitic root-knot and cyst nematodes to increase disease, and can persist in soils for years in the absence of a host crop. Fusarium wilt may best be managed in tobacco by integrating different tactics, including plant resistance, sanitation, rotation, nutrition, nematode management, and fumigation or biofumigation. Wilt resistance has been, and continues to be, the most effective and economical means of reducing disease. However, wilt resistance does not eliminate the pathogen from soils, so breeders and pathologists must work together to develop and deploy wilt-resistant tobacco cultivars indefinitely.

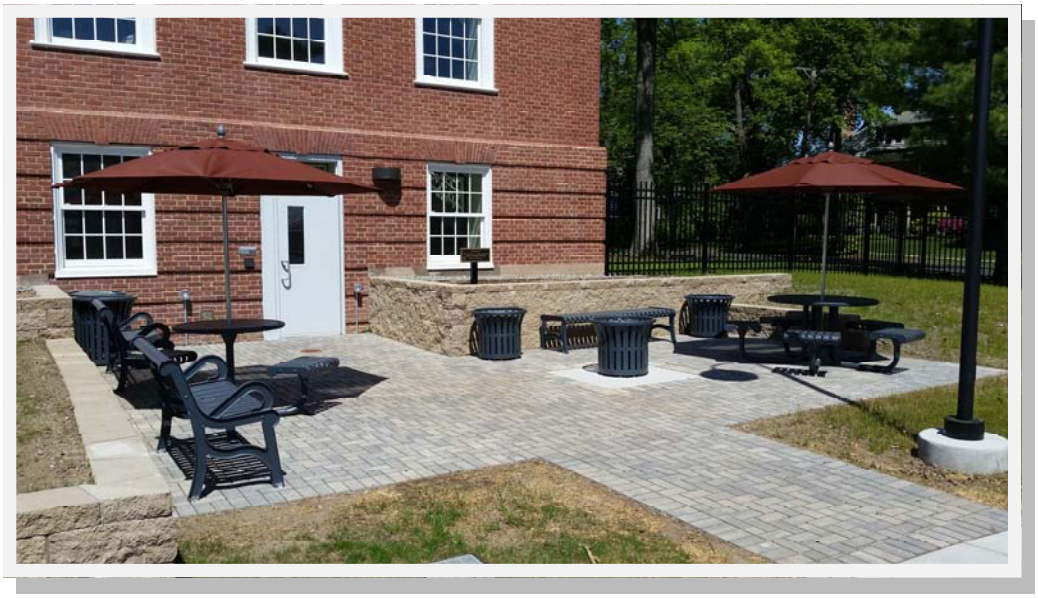
Zhou, Li-Wei, Yun Cao, Sheng-Hua Wu, Josef Vlasákc, **De-Wei Li**, Yu-Cheng Dai. 2015 (2014). Global diversity of the *Ganoderma lucidum* complex (Ganodermataceae, Polyporales) inferred from morphology and multilocus phylogeny. *Phytochemistry* 114: 7–15 http://dx.doi: 10.1016/j.phytochem.2014.09.023

ABSTRACT: Species of the *Ganoderma lucidum* complex are used in many types of health products. However, the taxonomy of this complex has long been chaotic, thus limiting its uses. In the present study, 32 collections of the complex from Asia, Europe and North America were analyzed from both morphological and molecular phylogenetic perspectives. The combined dataset, including an outgroup, comprised 33 ITS, 24 *tef1α*, 24 *rpb1* and 21 *rpb2* sequences, of which 19 ITS, 20 *tef1α*, 20 *rpb1* and 17 *rpb2* sequences were newly generated. A total of 13 species of the complex were recovered in the multilocus phylogeny. These 13 species were not strongly supported as a single monophyletic lineage, and were further grouped into three lineages that cannot be defined by their geographic distributions. Clade A comprised *Ganoderma curtisii*, *Ganoderma flexipes*, *Ganoderma lingzhi*, *Ganoderma multipileum*, *Ganoderma resinaceum*, *Ganoderma sessile*, *Ganoderma sichuanense* and *Ganoderma tropicum*, Clade B comprised *G. lucidum*, *Ganoderma oregonense* and *Ganoderma tsugae*, and Clade C comprised *Ganoderma boninense* and *Ganoderma zonatum*. A dichotomous key to the 13 species is provided, and their key morphological characters from context, pores, cuticle cells and basidiospores are presented in a table. The taxonomic positions of these species are briefly discussed. Noteworthy, the epitypification of *G. sichuanense* is rejected.

Rapp, M., Schein, J., Hunt, K.A., Nalam, V., Mourad, G.S., **Schultes, N.P.** 2015. The solute specificity profiles of nucleobase cation symporter 1 (NCS1) from *Zea mays* and *Setaria viridis* illustrate functional flexibility. *Protoplasma* May 29 2015 DOI 10.1007/s00709-015-0838-x.

ABSTRACT: The solute specificity profiles (transport and binding) for the nucleobase cation symporter 1 (NCS1) proteins, from the closely related C4 grasses *Zea mays* and *Setaria viridis*, differ from that of *Arabidopsis thaliana* and *Chlamydomonas reinhardtii* NCS1. Solute specificity profiles for NCS1 from *Zea mays* (ZmNCS1) and *Setaria viridis* (SvNCS1) were determined through heterologous complementation studies in NCS1-deficient *Saccharomyces cerevisiae* strains. The four Viridiplantae NCS1 proteins transport the purines adenine and guanine, but unlike the dicot and algal NCS1, grass NCS1 proteins fail to transport the pyrimidine uracil. Despite the high level of amino acid sequence similarity, ZmNCS1 and SvNCS1 display distinct solute transport and recognition profiles. SvNCS1 transports adenine, guanine, hypoxanthine, cytosine and allantoin and competitively binds xanthine and uric acid. ZmNCS1 transports adenine, guanine, cytosine and competitively binds, 5-fluorocytosine, hypoxanthine, xanthine and uric acid. The differences in grass NCS1 profiles are due to a limited number of amino acid alterations. These amino acid residues do not correspond to amino acids essential for overall solute and cation binding or solute transport, as previously identified in bacterial and fungal NCS1, but rather may represent residues involved in subtle solute discrimination. The data presented here reveal that within Viridiplantae, NCS1 proteins transport a broad range of nucleobase compounds and that the solute specificity profile varies with species.

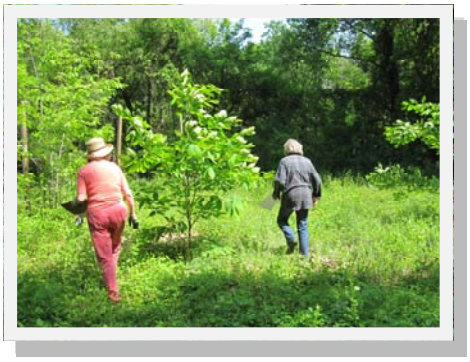
ARTICLES OF INTEREST MAY 2015



The Louis A. Magnarelli Patio has been finished. It is named in memory our former Director, who served from 2004-2013.

STATION NEWS

The Connecticut Agricultural Experiment Station



Barbara Wooten and Becky Jensen examining chestnut trees in the enclosure in Springer Glen Open-Space in Fairfield.

Station Staff Judge Projects at the 2015 New Haven Public Schools Science Fair at Yale University

From May 11-12, at the Yale University Commons, a team from the Experiment Station served as special awards judges for the New Haven Public Schools Science Fair, choosing winners for the two CAES awards. **Ms. Saryn Kunajukr, Ms. Lindsay Patrick**, and **Drs. Douglas Dingman, Sharon Douglas, Robert Marra,** and **Lindsay Triplett** served as judges. Two awards were granted, the first was *The Connecticut Agricultural Experiment Station Award* ($100) for the "Best project related to food, plants, insects, or the environment." The CAES team unanimously chose Katie Rae Reynolds and Mara Cicarella from Ms. Evelyn Gallagher's class at Nathan Hale School for their project titled "One Fish, Two Fish, Hot Fish, Cold Fish." The second award was the *Albert E. Dimond Award of The Connecticut Agricultural Experiment Station* ($150) for the "Best project demonstrating an innovative approach to discovery in plant science" (open to grades 6-12). The recipient of this award was Ayanna Blowes from Ms. Jillian Sinquefield's class at Barnard Environmental Studies Magnet School for her project titled "Hydroponics Vs. Soil."

Dr. Marra presented the CAES awards and certificates to the students at the Awards Ceremony on the evening of May 13, which was held in Yale University's Sheffield-Sterling-Strathcona Hall.

Dr. Robert Marra presenting *The Connecticut Agricultural Experiment Station Award* to Mara Cicarella and Katie Rae Reynolds for their project "One Fish, Two Fish, Hot Fish, Cold Fish."

CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

STATION NEWS

The Connecticut Agricultural Experiment Station

JOURNAL ARTICLES APPROVED MAY 2015

Cowles, R. S. White grub control, neonics, bees, and the big picture. *Connecticut Gardener*

De La Torre Roche, R., A. Servin, J. Hawthorne, B. Xing, L. A. Newman, X. Ma, G. Chen, and **J. C. White**. Terrestrial trophic transfer of bulk and nanoparticle La_2O_3 does not depend on particle size. *Environmental Science & Technology*

Elmer, Wade, and **Jason White.** Foliar application of nanoparticles of CuO suppresses Verticillium wilt of eggplants. Plant Disease

Gent, Martin, and Ido Seginer. Dynamic carbohydrate supply and demand model of vegetative growth. *Acta Horticulturae* (abstract)

LaMondia, J. A. Hatch stimulation and host status of tobacco (*Nicotiana tabacum*), eastern black nightshade (*Solanum ptychanthum*), and sticky nightshade (*Solanum sisymbriifolium*) to the tobacco cyst nematode, *Globodera tabacum*. *Journal of Nematology* (abstract)

Li, De-Wei, R. F. Castañeda-Ruiz, and **James LaMondia.** Evolution of fungi and update on ethnomycology. Book Chapter, *Biology of Microfungi* (Edited by De-Wei Li)

Majumdar, S., E. A. Arigi, H. Choi, J. Trujillo-Reyes, J. P. F. Margez, I. C. Almeida, **J. C. White,** J. R. Peralta-Videa, J. Garden-Torresdey. Nanoceria modulates kidney bean proteome and compromises seed quality. *Nature*

Molaei, Goudarz, M. Thomas, T. Muller, J. Medlock, **J. Shepard, P. Armstrong,** and **T. Andreadis.** Dynamics of vector-host interactions and the role of avian species as superspreaders of EEE virus. PLOS Neglected Tropical Diseases

Smith, V. L. Southern pine beetle & cynipid gall wasp: two new players. *CTPA Newsletter*

Stafford III, Kirby C. The prevention of tick bite and tick-borne disease: tick checks and the use of insect repellents. *CAES Fact Sheet*

Steven, B., C. R. Kuske, L. V. Gallegos-Graves, S. C. Reed, and J. Belnap. Experimental climate and land use manipulations result in distinct biological soil crust communities. *Applied and Environmental Microbiology*

Triplett, Lindsay R. Rhododendron tissue proliferation. *CAES Fact Sheet*

Vossbrinck, C. R. Overwintering and propagation of figs in Connecticut. *CAES Fact Sheet*

Bennett, J. S. Bhattacharyya, A. Chauhan, H. Grecsek, M. Heintz, M. Latshaw, C. Martina, L. Petersen-Wright, D. Rice, C. Smith, T. Theisen, K. Wangsness, **J. C. White**, and M. Wichman. *Nanotechnology and Environmental Health Laboratories: White paper*. April White Paper

Zeng, Quan. Fire blight management at bloom. *CAES Fact Sheet*

CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

STATION NEWS

The Connecticut Agricultural Experiment Station

GRANTS RECEIVED MAY 2015

Gregory Bugbee, A study of the distribution of invasive Aquatic Plants in Lakes Candlewood, Lillinonah and Zoar. FirstLight Power Resources, retroactively for work performed in 2014; $44,135,.

Executive Summary: The Connecticut Agricultural Experiment Station (CAES) Invasive Aquatic Plant Program (IAPP) performs annual surveys of Lakes Candlewood, Lillinonah and Zoar for invasive aquatic vegetation. These surveys and resulting reports fulfill requirements of the Housatonic River Project: Federal Energy Regulatory Commission (FERC) Project No. 2576. Yearly reports are submitted to FirstLight Hydro Generating Company. After approval by a Technical Advisory Committee, reports are forwarded to FERC. The invasive species Eurasian watermilfoil (*Myriophyllum spicatum*), dominate the plant communities in the three lakes but was most troublesome in Lake Candlewood. Also present, in all three lakes are the invasive species minor naiad (*Najas minor*), and curlyleaf pondweed (*Potamogeton crispus*). A small population of invasive water shamrock (*Marsilea quadrifolia*) occurs only in Lake Zoar. In 2011 and 2012, we found the potentially destructive invasive plant water chestnut (Trapa natans) in Lake Lillinonah. Eurasian watermilfoil acreage in Lake Candlewood was 221 acres in 2007, 451 acres in 2008, 373 acres in 2009, 461 acres in 2010, 331 acres in 2011, 505 acres in 2012, 259 acres in 2013, and 477 acres in 2014. Deep drawdowns (3 meters), in the odd numbered years, result in the smaller acreages while shallow drawdowns (1 meter), in the even numbered years, result in the larger acreages. No drawdowns or other large-scale invasive plant control are used in Lake Lillinonah. Last year an herbicide application to Eurasian watermilfoil in Lake Zoar resulted considerable control.

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION

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

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

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

Griswold Research Center
190 Sheldon Road
Griswold, CT 06351-3627
Phone: 860-376-0365

Putting Science to Work for Society.

CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

WWW.CT.GOV/CAES

Entrance to The Connecticut Agricultural Experiment Station in New Haven on Huntington Street

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

The Connecticut Agricultural Experiment Station (CAES) prohibits discrimination in all of its programs and activities on the basis of race, color, ancestry, national origin, sex, religious creed, age, political beliefs, sexual orientation, criminal conviction record, gender identity, genetic information, learning disability, present or past history of mental disorder, mental retardation or physical disability including but not limited to blindness, or marital or family status. To file a complaint of discrimination, write Director, The Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven, CT 06504, or call (203) 974-8440. 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 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, Mrs. Vickie Bomba-Lewandoski., and Ms. Rebecca Carlone