Station News

The Connecticut Agricultural Experiment Station
Volume 6 Issue 9 September 2016

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

CAES

The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

This Issue

ADMINISTRATION

DR. THEODORE ANDREADIS was interviewed about Connecticut's response to the Zika virus by WFSB TV 3 Hartford (August 2); presided over a quarterly meeting of the Station's Board of Control held at Lockwood Farm (August 3); was interviewed about the West Nile virus activity in Connecticut this summer by Amanda Cuda, Connecticut Post (August 9); was interviewed about Zika virus and the CAES mosquito and arbovirus surveillance program by WNPR Connecticut Public Radio, Hartford (August 11); participated in a press conference with Congresswoman Rosa DeLauro and Connecticut Public Health Commissioner, Raul Pino to express support for federal funding Zika virus research and mosquito control held at Lockwood Farm (August 12); was interviewed about the recent emergence of salt marsh mosquitoes along the Connecticut coastline by Marc Sims, WNPR Connecticut Public Radio, Hartford and Fran Schneidau, WCBS radio New York (August 16); was interviewed about the detection and West Nile virus in several towns in Fairfield Connecticut by Amanda Cuda, Connecticut Post (August 22); presented an overview of scientific staff and research activities at the Center for Vector Biology & Zoonotic Diseases at CAES at an orientation session for incoming MPH students within the Department of Epidemiology of Microbial Diseases at the YALE School of Public Health (August 23); participated in a Zika Vector Control Response Tabletop Exercise attended by Governor Malloy and sponsored by the Connecticut Department of Public Health (August 24); participated in a press conference held at the Station with Senator Richard Blumenthal to express support for federal funding Zika virus research and mosquito control and provide an update on mosquito testing. The press conference was followed by a tour of the Biosafety Level 3 and Mosquito laboratories (August 30); participated in the formal signing by Governor Malloy of Public Act No. 16-17: An Act Concerning Pollinator Health held at the State Capitol in Hartford (August 30).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE attended the International Association for Food Protection (IAFP) annual meeting in St. Louis MO and gave an invited lecture entitled "Engineered Nanoparticles in Food: Implications for Food Safety and Consumer Health" (150 attendees)(August 1-4); hosted Margaret Horsfall Schadler, Anne Horsfall Thomas (daughters of former CAES Director James Horsfall), and David Thomas for a CAES tour and description of programs (August 4); participated in an FDA Animal Feed Regulatory Program Standards (AFRPS) webinar on the cooperative agreement program sampling agreement protocol (August 10); along with **MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, DR. WALTER KROL, MR. CRAIG MUSANTE, MS. KITTIPATH P.-RIVEROS, DR. BRIAN EITZER, AND MS. TERRI ARSENAULT** participated in the monthly FDA FERN cCAP teleconference call (August 11); and attended the 252nd American Chemical Society annual meeting in Philadelphia PA and gave a lecture entitled "Nanoscale Nutrients Suppress Plant Disease and Increase Crop Yield." (15 attendees) (August 21-24).

DR BRIAN EITZER along with **DR. RICHARD COWLES** and **DR. KIMBERLY STONER** and many colleagues at other institutions (lead P.I Cristi Palmer from Rutgers) received a grant from NIFA on "Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture" the CAES portion $263,959 over the next two years; presented a talk entitled "Analysis of Pesticide Residues in Pollens and Nectars from Plants at Ornamental Nurseries and Bee Collected Pollen at Those Nurseries" at the American Chemical Society's 252 National Meeting in Philadelphia PA, August 21 (30 people).

ENTOMOLOGY

DR. KIRBY C. STAFFORD III was interviewed by Nate Lynch, the Day, about aerial spraying for gypsy moth (August 1), interviewed by Leslie Mayes, NBC Connecticut, about spraying for gypsy moths in Ledyard (August 2); interviewed again by Nate Lynch, The Day, about aerial spraying for gypsy moth in Ledyard and potential for defoliation in 2017 (August 11); presented a talk on tick-borne diseases in a webinar for Premise Health (August 12); and was interviewed by Annette Heist, an independent science writer, about gypsy moth (August 31).

MR. MARK H. CREIGHTON visited and spoke with Jay Milone at West Rock Nature Center about establishing an Apiary at the center in coordination Common Ground High School and The Youth Beekeeping Program (August 8) and spoke with the Manager at Yale Gardens about setting up an educational program (August 18).

DR. GALE E. RIDGE was interviewed by WCBS about flying cockroaches, bed bugs, and wasps and the effect of high summer temperatures on insect activity (August 11); ran a mattress recyclers training program at Recyc-Mattresses Corp, East Hartford on protection against bed bugs (10 attendees) (August 16); and spoke to residents of Ella B. Scantlebury Senior Residence, New Haven, about community management of bed bugs (38 attendees) (August 18).

DR. VICTORIA L. SMITH with **MR. MICHAEL LAST**, **DR. THEODORE G. ANDREADIS**, and **MS. VICKIE BOMBA-LEWANDOSKI**, met with Dennis Geshel of DAS-BEST in the Slate Board Room for a demonstration of the state eLicense system, which the Experiment Station will soon be joining for apiary and nursery registration (August 23).

DR. KIMBERLY A. STONER gave an introductory talk about Permaculture before the film "Inhabit" at Books and Company, Hamden (35 attendees) (August 10); gave a talk, "Bees in the Schoolyard" to 105 school and municipal groundskeepers at the UConn School and Municipal Turf/Grounds Workshop: Managing Without Pesticides at the East Lyme Middle School (August 18); and with **DR. THEODORE G. ANDREADIS** and **DR. RICHARD S. COWLES** participated in Governor Malloy's signing ceremony for Public Act 16-17, An Act Concerning Pollinator Health at the Governor's Office in Hartford (August 30).

DR. KIMBERLY A. STONER, DR. BRIAN EITZER, and DR. RICHARD COWLES will be receiving a Specialty Crops Research Initiative grant of $263,959 from the U.S. Department of Agriculture, National Institute of Food and Agriculture, as part of a multistate, multi-disciplinary project, "Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture." Dr. Stoner will be measuring the relative attractiveness of ornamental plants to a diversity of bees, using direct observation in the field and analysis of trapped pollen from honey bee hives. Dr. Cowles and Dr. Eitzer will measure the dynamics of movement of systemic insecticides into the pollen and nectar of ornamental plants, with differences in the timing, rate and method of application.

DR. KIRBY C. STAFFORD III, DR. SCOTT C. WILLIAMS, and DR. GOUDARZ MOLAEI have received a USDA-ARS cooperative agreement for $150,000 a year for up to five years for a project titled "Integrated Tick Management for the Suppression of Blacklegged Tick Populations in the Suburban Landscape". This project will involve combinations of spraying, the deer 4-poster self-treatment stations, and the fipronil-based rodent bait boxes in a Connecticut and Maryland community to reduce the risk of Lyme disease and other tick-associated diseases.

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO gave the lecture "Adsorption and reactions of organic compounds on pyrogenic carbonaceous surfaces: so, what else is new?" at the three-day symposium in his honor, *The Chemistry of Environmental Sorptive and Oxidative Processes: A symposium in honor of Joseph J. Pignatello*, at the American Chemical Society National Meeting, Philadelphia PA (approximately 150 attendees) (August 22-24).

DR. PHILIP ARMSTRONG, along with **DR. THEODORE ANDREADIS**, participated in a Zika virus emergency response exercise with the Governor, Lieutenant Governor, and Commissioner of Public Health, as well as representatives from the Departments of Public Health, Emergency Services, Energy and Environment (August 24); and was interviewed by News 12 Connecticut about the salt marsh mosquitoes (August 17); by News Channel 8 about West Nile virus (August 17); by Fox Channel 61 and Fox News about West Nile virus (August 19); by Wall Street Journal about monitoring mosquitoes for Zika virus (August 22); by Wall Street Journal about West Nile virus risk in Connecticut (August 26); by New Haven Register about detection of West Nile virus in East Haven (August 30); and by News Channel 8 about the first human case of West Nile virus (August 30).

MR. GREGORY BUGBEE spoke on "Invasive aquatic plants in Coventry Lake" at a town meeting held at the Coventry Lake Lodge (approximately 75 attendees) (July 13); received, along with co-authors Ms. Jordan Gibbons and Dr. Mark June-Wells, the 2015 "Outstanding Contribution of the Year Award" by the National Aquatic Plant Management Society for the journal article, "Efficacy of single and consecutive early-season diquat treatments on curlyleaf pondweed and associated aquatic macrophytes: A case study" (July 21); spoke on "CAES IAPP surveys of Bashan Lake and control of phragmites" at a meeting of The Bashan Lake Association in East Haddam Grange Hall (approximately 90 attendees) (July 27) and was interviewed by Katrina Koerting of the Danbury News Times on invasive aquatic plants in Candlewood Lake (http://www.newstimes.com/local/article/Scientist-One-of-the-worst-milfoil-seasons-at-9132399.php) (August 9).

DR. BLAIRE STEVEN gave a talk on microbiology and climate change to the Hamden Rotary Club (approximately 15 attendees) (August 16); and gave the poster "Sudden vegetation dieback in a coastal wetland: A model for 'blue carbon'" at the International Society of Microbial Ecologists General Meeting in Montreal Canada (August 23).

FORESTRY AND HORTICULTURE

DR. JEFFREY WARD met with Will Hochholzer, Emery Gluck, and Dan Evans (DEEP foresters) to discuss management alternatives for forests severely impacted by gypsy moth defoliation (August 5) and along with **MR. JOSEPH P. BARSKY**, and met with Bob Melusky and Doug MacGillvary (Manchester Land Trust) to discuss controlling invasive species (August 31).

DR. ABIGAIL MAYNARD reported on Station activities at a quarterly meeting of the Council on Soil and Water Conservation in Windsor (16 participants) (August 4); discussed okra and specialty eggplant cultivation with a grower at the Westville Farmer's market (August 21); and reported on Station activities at a meeting of the State Technical Committee in Tolland (August 31).

DR. SCOTT WILLIAMS with **MR. MICHAEL R. SHORT** and **MS. MEGAN LINKSE**, was shadowed by Jim Sopelak and his two sons, Hunter (14), and Logan (11) who are interested in pursuing a career in wildlife biology, Redding (August 18).

MS. JOAN L. BRAVO spoke on "How to improve yields through pruning to obtain balanced vines" at the Connecticut Farm Wine Development Council's Research & Education Twilight Meeting for Wineries & Vineyards at Paradise Hills Vineyard (63 attendees) (August 9).

PLANT PATHOLOGY AND ECOLOGY

DR. WADE ELMER met with Dr. Nancy Rechcigl, a Technical Field Manager – Ornamentals at Syngenta Company, and discussed fungicide trials for Fusarium and Pythium on ornamentals (August 9); attended the Connecticut Farm Wine Development Council's Research and Reducation Twilight meeting for Connecticut Wineries and Vineyards at Paradise Hills Vineyard & Winery in Wallingford (August 9); was interviewed by Dr. Richard Massey of The Royal Society of Chemistry's (RSC) members' magazine *Chemistry World* about his recent *RSC Environ Nano* article on nanoparticles on vegetable diseases (August 11); and was interviewed by Jan Speigel of *CT Mirror* about nanoparticles in agriculture (August 17).

DR. FRANCIS FERRANDINO presented the results of his winegrape research at CAES over the past eight years at The Connecticut Farm Wine Development Council's Research and Education Twilight meeting for Connecticut Wineries and Vineyards at Paradise Hills Vineyard & Winery in Wallingford (63 attendees) (August 9).

DR. YONGHAO LI parrticipated in an NPDN and USDA-APHIS-PPQ conference call about a new bacterial plant disease of corn (August 4), met with Dr. Nancy Rechcigl, a Technical Field Manager – Ornamentals at Syngenta Company, and discussed fungicide trails of Phytophthora root rot of fir and foliar diseases of spruce (August 9); presented the talk "Understanding Common Plant Disease and Design Strategies" for the continuing education program for landscape architects and landscape designers in Hamden (40 adults) (August 16); and gave a talk entitled "Disease Management of Christmas Trees" at the CCTGA twilight meeting in Oxford (35 adults) (August 17).

DR. QUAN ZENG presented a poster presentation "Comparative genomic analyses of Acidovorax pathogens provide insights into the emergence of a new turfgrass disease and the host specificity" (~150 attendees) and co-organized the Bacteriology Committee Meeting as the vice chair, attended the APHIS Widely Prevalent Bacterial Committee meeting at the Annual Meeting of the American Phytopathological Society (APS) in Tampa, FL (July 31-August 2).

VALLEY LABORATORY

DR. RICHARD COWLES presented the Barn Exhibit "Neonicotinoid Exposure of Honey Bees" at Plant Science Day, Hamden (August 3); discussed "Insect pests of Christmas trees" at the CT Christmas Tree Growers' meeting in Oxford (40 attendees) (August 17); and participated with the ceremonial signing of the bill "An Act Concerning Pollinator Health" at the Governor's office (25 attendees) (August 30).

DR. JAMES LAMONDIA was interviewed about hops research by Alison Kuznitz and Johnathon Henninger for the Connecticut Post (August 3); met with Ross Eddy and Martha Dorsey, County Executive Director of the Hartford/Tolland Farm Service Agency to discuss research and services at the Valley Lab (August 8); was interviewed with Katja Maurer about hops research by Nicholas Leahey for the Journal Inquirer (August 16); and was interviewed about hops research and resurgence in CT by Sarah Page Kyrcz for the Shoreline Times (August 29).

DR. KATJA MAURER presented a short talk titled "'Hops – a new specialty crop in Connecticut" at the Plant Science Day at Lockwood Farm, Hamden (200 attendees) (August 3); was interviewed about growing hops in CT by Alison Kuznitz and Johnathon Henninger of the CT Post (August 3); was interviewed about hops by Nicholas Leahey of the Journal Inquirer (August 16); and conducted a tour of the hop research plot at the Valley Laboratory and spoke about hops to the New Haven Brew Club (7 attendees) (August 26).

DEPARTMENTAL RESEARCH UPDATES AUGUST 2016

Doug E Brackney and **Philip M Armstrong**, Transmission and evolution of tick-borne viruses, *Current Opinion in Virology* 21: 67–74 (2016).

Abstract. Ticks transmit a diverse array of viruses such as tick-borne encephalitis virus, Powassan virus, and Crimean-Congo hemorrhagic fever virus that are reemerging in many parts of the world. Most tick-borne viruses (TBVs) are RNA viruses that replicate using error-prone polymerases and produce genetically diverse viral populations that facilitate their rapid evolution and adaptation to novel environments. This article reviews the mechanisms of virus transmission by tick vectors, the molecular evolution of TBVs circulating in nature, and the processes shaping viral diversity within hosts to better understand how these viruses may become public health threats. In addition, remaining questions and future directions for research are discussed

Shepard JJ, Andreadis TG, Thomas MC, Molaei G. Host associations of mosquitoes at eastern equine encephalitis virus foci in Connecticut, USA. *Parasites & Vectors* 9:794 (2016); doi: 10.1186/s13071-016-1765-1

Abstract. Eastern equine encephalitis virus (EEEV) is a highly pathogenic mosquito-borne arbovirus, with active transmission foci in freshwater hardwood swamps in eastern North America, where enzootic transmission is maintained between the ornithophilic mosquito, *Culiseta melanura*, and wild passerine birds. The role of other locally abundant mosquito species in virus transmission and their associations with vertebrate hosts as sources of blood meals within these foci are largely unknown but are of importance in clarifying the dynamics of enzootic and epidemic/epizootic transmission. Blood-engorged mosquitoes were collected from resting boxes at four established EEEV foci in Connecticut during 2010–2011. Mosquitoes were identified to species, and the identity of vertebrate hosts was determined based on mitochondrial cytochrome *b* and/or cytochrome *c* oxidase subunit I gene sequences of polymerase chain reaction products. The vertebrate hosts of 378 (50.3 % of engorged mosquitoes) specimens, representing 12 mosquito species, were identified. *Culiseta morsitans* ($n = 54$; 67.5 %), *Culex restuans* ($n = 4$; 66.7 %), and *Cx. pipiens* ($n = 2$; 100 %) acquired blood meals exclusively from avian hosts, whereas *Aedes cinereus* ($n = 6$; 66.7 %), *Ae. canadensis* ($n = 2$; 100 %), and *Ae. stimulans* ($n = 1$; 100 %) obtained blood meals solely from mammals. Species that fed opportunistically on both avian and mammalian hosts included: *Ae. thibaulti* ($n = 21$ avian, and $n = 181$ mammalian; 57.2 %), *Anopheles punctipennis* ($n = 8$ and $n = 40$; 44.0 %), *An. quadrimaculatus* ($n = 1$ and $n = 23$; 35.7 %), *Coquillettidia perturbans* ($n = 3$ and $n = 3$; 46.2 %) and *Ae. abserratus* ($n = 1$ and $n = 2$; 23.1 %). *Culex territans* obtained blood meals from avian and amphibian hosts ($n = 18$ and $n = 5$; 26.6 %). Mixed blood meals originating from both avian and mammalian hosts were identified in *An. quadrimaculatus* ($n = 1$), and *Cx. territans* ($n = 2$). Our findings indicate that wood thrush, tufted titmouse, and a few other avian species serve as hosts for mosquitoes, and likely contribute to amplification of EEEV. Our study supports the role of *Cs. morsitans* in enzootic transmission of EEEV among avian species. *Culex territans* will seek blood from multiple vertebrate classes, suggesting that this species may contribute to epizootic transmission of the virus. Our findings support roles for *Cq. perturbans* and *An. quadrimaculatus* as epidemic/epizootic vectors to humans, horses, and white-tailed deer. Despite its abundance, the potential of *Ae. thibaulti* to serve as a "bridge vector" for EEEV remains unclear in the absence of any definitive knowledge on its competency for the virus. The contribution of white-tailed deer to the dynamics of EEEV transmission is not fully understood, but findings indicate repeated exposure due to frequent feeding by vector competent mosquito species.

Graney, L., **Elmer, W. H**., and Loyd, A. L. 2016 First Report of Fusarium Wilt of Yellowwood (*Cladrastis kentukea*) Caused by *Fusarium oxysporum.* Plant Disease doi: http://dx.doi.org/10.1094/PDIS-05-16-0644-PDN

Abstract. In May 2012, a 3 yr-old yellowwood tree located in Chevy Chase, MD that was 4.8 m tall with a stem diameter of 10 cm exhibited interveinal chlorosis, marginal curling, and wilting of leaves of one entire branch accompanied with vascular discoloration. Isolation revealed a *Fusarium* species. Monosporic cultures were grown in 1/4 APDA and mycelium harvested for DNA extraction. The translation elongation factor 1-alpha *(tef*-α) gene was amplified with conventional PCR using primers EF1/EF2, and sequenced using primers EF22T/EF3 (GenBank Accession No. KX171018) as previously described (K. O'Donnell et al. 1998). Sequence blasts in the Fusarium-ID database (www.fusariumdb.org) had an identical match with a deposited sequence of *F. oxysporum* associated with a vascular wilt on mimosa in Virginia (Geiser et al. 2004). In 2014 and 2015, three 3- year old yellowwood trees (two-2.54 cm branches on each tree) were inoculated by placing a colonized 5 mm agar plug of a *F. oxysporum* yellowwood isolate into a slit made by cutting into the cambium tissue with a sterile scalpel and wrapped in parafilm. Vascular discoloration was observed in all inoculated branches. Based on a review of the USDA ARS fungal database and personal communication with Dr. Jay Stipes, (VA Tech Blacksburg, VA) wilt disease caused by *F oxysporum* has not been reported or observed on yellowwood. This is a first report of Fusarium oxysporum associated with a vascular wilt on yellowwood.

Kelly, A., Proctor, R.H., Belzile, F., Chulze, S.N., Clear, R.M., Cowger, C., **Elmer, W.,**

Lee, T., Obanor, F., Waalwijk, C., Ward, T.J., 2016.The geographic distribution and complex evolutionary history of the NX-2 trichothecene chemotype from *Fusarium graminearum*, Fungal Genetics and Biology, doi: http://dx.doi.org/10.1016/j.fgb.2016.08.003

Abstract. *Fusarium graminearum* and 21 related species comprising the *F. sambucinum* species complex lineage 1 (FSAMSC-1) are the most important Fusarium Head Blight pathogens of cereal crops worldwide. FSAMSC-1 species typically produce type B trichothecenes. However, some *F. graminearum* strains were recently found to produce a novel type A trichothecene (NX-2) resulting from functional variation in the trichothecene biosynthetic enzyme Tri1. We used a PCR-RFLP assay targeting the *TRI1* gene to identify the NX-2 allele among a global collection of 2,515 *F. graminearum*. NX-2 isolates were only found in southern Canada and the northern U.S., where they were observed at low frequency (1.8%), but over a broader geographic range and set of cereal hosts than previously recognized. Phylogenetic analyses of *TRI1* and adjacent genes produced gene trees that were incongruent with the history of species divergence within FSAMSC-1, indicating trans-species evolution of ancestral polymorphism. In addition, placement of NX-2 trains in the *TRI1* gene tree was influenced by the accumulation of nonsynonymous substitutions associated with the evolution of the NX-2 chemotype, and a significant ($P < 0.001$) change in selection pressure was observed along the NX-2 branch ($\omega = 1.16$) in comparison to other branches ($\omega = 0.17$) in the *TRI1* phylogeny. Parameter estimates were consistent with positive selection for specific amino-acid changes during the evolution of NX-2, but direct tests of positive selection were not significant. Phylogenetic analyses of fourfold degenerate sites and intron sequences in *TRI1* indicated the NX-2 chemotype had a single evolutionary origin and evolved recently from a type B ancestor. Our results indicate the NX-2 chemotype may be indigenous, and possibly endemic, to southern Canada and the northern U.S. In addition, we demonstrate that the evolution of *TRI1* within FSAMSC-1 has been complex, with evidence of trans-species evolution and chemotype-specific shifts in selective constraint.

Elmer, W. H. 2016 Effect of leaf mold mulch, biochar, and earthworms on mycorrhizal colonization and yield of asparagus affected by Fusarium crown and root rot. Plant Disease doi: http://dx.doi.org/10.1094/PDIS-10-15-1196-RE

Abstract. Asparagus can suffer from a crown and root rot caused by *Fusarium oxysporum* f. sp. *asparagi* and *F. proliferatum*. The disease is exacerbated when allelopathic toxins from old, rotting asparagus crowns are present in the soil. To minimize the damage from the replant problem, three strategies were examined: 1) biochar, 2) application of earthworms (*Lumbricus terrestris*), and 3) leaf mold to serve as a compost mulch and food source for earthworms. In a greenhouse, asparagus transplants were grown in soil amended with pathogen-infested asparagus residues or in non-amended soil, then both types of soil were augmented with biochar, earthworms, the combination of biochar and earthworms, or no treatment. Biochar increased AM colonization by 170% and reduced the incidence of root lesions by 57%; however, plant weight was not affected by any of the soil treatments and there were no significant interactions among the main effects. In the absence of infested asparagus residues, biochar reduced plant growth by 32%. Field plots that had severe crown and root rot, along with two other fields that had never been planted to asparagus, were planted with asparagus crowns and treated with leaf mold mulch, earthworms plus leaf mold mulch, biochar, or biochar plus earthworms plus leaf mold mulch. Untreated plots served as the control treatment. One year later, asparagus roots sampled from plots in the two new fields had a threefold increase in AM colonization when treated with biochar compared to control plots. Biochar did not increase yield over the duration of the 2012-2014 harvests when compared to that of the control plots. No soil treatment affected root colonization by AM in the field where Fusarium crown and root rot was severe. Compared to the untreated control plots, the leaf mold mulch treatment applied alone increased the marketable yields in each year of harvest. Combining leaf mold with earthworms provided no added benefit. Soil amendment with leaf mulch alone may hold promise in improving asparagus production in newly planted asparagus fields.

Zarrillo. T., J. S. Ascher, J. Gibbs, and **K. Stoner**. 2016. New and Noteworthy Records of Bees (Hymenoptera: Apoidea: Anthophila) for Connecticut. Journal of the Kansas Entomological Society 89 (2): 138-157.

Abstract. We report and annotate new Connecticut state records for fourteen bee species: Eucera (Synhalonia) hamata (Bradley), Holcopasites calliopsidis calliopsidis (Linsley), Nomada tiftonensis Cockerell, Triepeolus remigatus (Fabricius), Andrena (Derandrema) uvulariae Mitchell, Pseudopanurgus compositarum (Robertson), Lasioglossum (Dialictus) abanci (Crawford), Lasioglossum (Dialictus) lionotum (Sandhouse), Lasioglossum (Dialictus) michiganense (Mitchell), Lasioglossum (Dialictus) platyparium (Robertson), Lasioglossum zonulum (Smith), Hylaeus (Prosopis) illinoisensis (Robertson), Hylaeus (Prosopis) aff. nelumbonis, and Hylaeus (Prosopis) schwarzii (Cockerell). In addition, we report and discuss other noteworthy bee records from Connecticut to clarify taxonomy, nomenclature, status, habitat, or ecoregion.

Zarrillo, T. 2016. A Survey of the bees (Hymenoptera:Apoidea) of Grass Island Preserve, Connecticut. M. S. Thesis. Southern Connecticut State University; New Haven, Connecticut; 127 pp.

Abstract. Efforts to document current wild bee faunas are imperative as evidence of changes in local abundance, geographical range, and species diversity among many taxa accumulates. These changes and declines have led to an intensified effort to survey wild bees in representative habitats throughout North America. The objective of this study was to characterize the wild bee fauna of one such coastal habitat in Connecticut, USA, specifically to examine marsh, dune, and coastal scrub bee communities.

Biweekly surveys were conducted at Grass Island Preserve (Guilford, CT) over a two-year period (2011-2012) using pan traps and effort-based (timed) net collecting. A total of 3929 individual bees were collected, representing five families, 18 genera and 80 species. The total number of species collected represents approximately 23% of the known Connecticut bee fauna. Three species -*Hylaeus illinoisensis* (Robertson)*; Hylaeus* aff. *nelumbonis* (undescribed)*; Lasioglossum michiganense* (Mitchell) - are newly recorded for Connecticut. Species accumulation curves constructed for all sub-habitats indicated that bee diversity was steadily increasing over the sample period. No asymptote in accumulation curves were observed at any site.

JOURNAL ARTICLES APPROVED AUGUST 2016

Duzy, L. M., A. J. Price, K. S. Balkcom, and **J. S. Aulakh**. Assessing the economic impact of inversion tillage, cover crops, and herbicide regimes in Palmer amaranth (*Amaranthus palmeri*). *International Journal of Agronomy*

Eevers, N., **J. C. White**, N. Weyens, and J. Vangrosveld. Bio- and phytoremediation of pesticide contaminated environments: a review. *Advances in Botanical Sciences*

Lamers, V., M. H. Stowe, I. B. Slizovskiy, S. J. Trufan, **J. C. White**, and P. M. Rabinowitz. Water quality near shale gas development sites in rural southwestern Pennsylvania. *Environmental Science & Technology*

Langlois, P. A., J. Snelling, J. P. Hamilton, C. Bragard, R. Koebnik, V. Verdier, **L. R. Triplett**, J. Blom, N. A. Tisserat, and J. E. Leach. Characterization of the *Xanthomonas translucens* complex using draft genomes, comparative genomics, phylogenetic analysis, and diagnostic LAMP assays. *Phytopathology*

Lui, H., C. Ma, G. Chen, **J. C. White**, O. Parkash Dhankher, and B. Xing. Titanium dioxide nanoparticles alleviate tetracycline toxicity to *Arabidopsis thaliana*. *ACS Sustainable Chemistry and Engineering*

Rodrigues, S., N. Dokoozlian, C. O. Hendren, B. Karn, M. Mauter, O. Sadik, M. Safarpour, J. Unrine, J. Viers, **J. C. White**, M. R. Wiesner, and G. V. Lowry. Nanotechnology for sustainable food production: high value opportunities and scientific challenges. *ACS Nano*

Ruotolo, R., E. Maestri, M. Marmiroli, L. Pagano, **J. C. White**, and N. Marmiroli. Plant response to metal-containing engineered nanoparticles: an omics-based systems biology perspective. *Environmental Science & Technology*

ARTICLES OF INTEREST AUGUST 2016

DR. WADE ELMER and **DR. ROBERT MARRA** along with 24 members of the Hiking Alliance hiking Group harvested eggplants, tomatoes, cucumbers, peppers, and yellow squash at Lockwood farm for the CT Food Bank (August 28).

Figure 1. Vegetables harvested

Figure 2. Members of the Hiking Alliance harvesting vegetables

The formal signing by Governor Malloy of Public Act No. 16-17: An Act Concerning Pollinator Health held at the State Capitol in Hartford (August 30).

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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

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Main Laboratories, New Haven

Lockwood Farm, Hamden

Griswold Research Center, Griswold

Valley Laboratory, Windsor

The Connecticut Agricultural Experiment Station

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