



# 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.



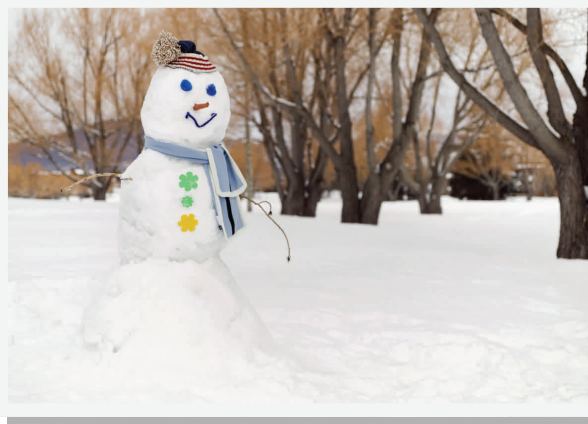
**VOLUME 4, ISSUE 12**

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**DECEMBER 2014**

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## DEPARTMENTAL NEWS

### ADMINISTRATION

**DR. THEODORE ANDREADIS** met with Kate Aitkenhead, Acting State Plant Health Director for CT/MA/RI, USDA, APHIS, PPQ to discuss plans for implementation of a state wide quarantine for the Emerald Ash Borer in Connecticut (November 4) and met with Dr. Ruth Montgomery and Dr. Durland Fish from Yale University School of Public Health to discuss collaborative research on modeling West Nile virus human infection risk in Connecticut (November 12).

### ANALYTICAL CHEMISTRY

**DR. JASON C. WHITE** attended the 3rd Annual Sustainable Nanotechnology Conference (SNO) in Boston MA and chaired a session entitled "Agriculture and Food" (November 2); participated in the Association of Public Health Laboratories (APHL) quarterly Agriculture and Chemist conference call (November 6); was interviewed by Robert Miller of the Danbury News Times about the a recent publication on the trophic transfer of nanoparticles (November 10); participated in a conference call with colleagues from Louisiana State University and several Romanian institutions concerning a joint grant proposal being submitted to the EU Program entitled "Safe Implementation of Innovative Nanoscience and Nanotechnology (SIINN)"(November 14, 28); along with **MS. KITTY PRAPAYOTIN-RIVEROS, MS. TERRI ARSENAULT, DR. BRIAN EITZER, MR. MICHAEL CAVADINI, DR. CHRISTINA ROBB, MR. JOSEPH HAWTHORNE, AND DR. WALTER KROL** participated in the monthly FDA FERN chemistry cooperative agreement program (cCAP) teleconference call (November 13), attended the Eastern Analytical Symposium and Exhibition (EAS) in Somerset NJ and chaired a session entitled "Detection and Fate of Nanoparticles in Biota" and presented a lecture entitled "Fate and Effects of Engineered Nanomaterials in Agricultural Systems" (10 attendees) (November 18); along with **MS. KITTY PRAPAYOTIN-RIVEROS, MS. TERRI ARSENAULT, DR. BRIAN EITZER, MR. MICHAEL CAVADINI, AND DR. CHRISTINA ROBB** participated in a bi-monthly FDA ISO Accreditation mentor/mentee conference call with the Ohio Department of Agriculture (November 20); and participated in an FDA 50-state conference call on food package labelling (November 25).

**DR. BRIAN EITZER** attended the monthly Emergency Preparedness meeting in at the Department of Public Health Rocky Hill (November 3), was a participant in the North American Chemical Residue Workshop program conference calls (November 6, 13, and 20), and was a participant in a conference call concerned with the planning of a new FERN LC/MS class (November 7).

**DR. CHRISTINA ROBB** conducted a tour of the department for the Sound School (15 attendees) (November 14), and attended the Eastern Analytical Symposium (EAS) in Somerset, NJ (November 16-19) and participated in the EAS Board meeting on the evening (November 16).

**MR. JOSEPH R. HAWTHORNE** participated in the NE FERN Webinar (November 19) and attended the Society of Environmental Toxicology and Chemistry (SETAC) North America 35<sup>th</sup> Annual Meeting in Vancouver, BC Canada and presented a poster titled "Identification and Avoidance of Potential Artifacts in Nanomaterial Ecotoxicity Measurements" and gave a lecture entitled "Trophic Transfer Potential of Cerium Oxide Nanoparticles Through Terrestrial Food Chains" (60 attendees) (November 11).



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### ENTOMOLOGY

**DR. KIRBY C. STAFFORD III** participated in a meeting of the Cooperative Agricultural Pest Survey (CAPS) in Wallingford (12 attendees) (November 6); participated in a conference call of the Tick IPM Working Group (November 12); presented a poster titled "Integrated control of the blacklegged tick (*Ixodes scapularis*) in a Lyme disease endemic community" at the annual meeting of the Entomological Society of America (November 18); and presented a talk titled "Ecological and biorational strategies for tick control and the prevention of tick-borne disease" in a symposium at the annual meeting of the Entomological Society of America held in Portland, OR (November 19).

**MR. MARK H. CREIGHTON** discussed overall bee health and winter preparation of hives with Ag students from Western Regional High School in their Bee Yard in Norfolk (November 4); set up a honeybee information table, spoke with Farm Bureau delegates on bee health issues, and collected Honeybee Registration forms at the annual Farm Bureau meeting in Wallingford (November 14); attended a lecture on winterization of honeybee colonies in North America while attending the Massachusetts Beekeepers Association meeting in Phillipston, MA (November 15); attended the Pollinator Conservation Course at the Cornell Cooperative Extension office in Riverhead, NY (November 18); and attended lectures on several honeybee-related topics at the Southern New England Beekeepers Assembly in Groton (November 22).

**MS. KATHERINE D. DUGAS** attended and ran the Cooperative Agricultural Pest Survey (CAPS) meeting held at the USDA-APHIS-PPQ offices in Wallingford (12 attendees) (November 6) and gave a talk regarding winter moth and emerald ash borer to the North Stonington Grange (20 attendees) (November 14).

**DR. CHRIS T. MAIER** spoke about the distribution and impact of the brown marmorated stink bug at a meeting of the Advisory Committee of the Cooperative Agricultural Pest Survey, USDA, in Wallingford (12 attendees) (November 6) and presented a poster titled "Emergence of Periodical Cicadas of Brood II in Connecticut in 2013" while attending the annual meeting of the Entomological Society of America in Portland, OR (November 18).

**DR. GALE E. RIDGE** became a committee member of the Connecticut Department of Public Health Legislation Hoarding Task Force (November 5); spoke about bed bug management in multi-unit housing at the Connecticut Apartment Association annual conference held at Foxwoods Casino in Ledyard (102 attendees) (November 7); hosted students from the Sound School in the insect inquiry office (15 students and teachers attended) (November 13); was interviewed about insects of medical importance in Connecticut by Harlan Levy of the Journal Inquirer (November 17); presented a half-day training program to pest management supervisors for their recertification accreditation in Meriden (114 attendees) (November 18); spoke about bed bugs, poverty, and current management to a meeting of Northeastern health directors, town officials, healthcare representatives, and social and emergency service providers in Brooklyn (75 attendees) (November 25); and as part the CAPS survey monitoring for exotic bark beetles (Scolididae), Dr. Ridge examined over 8,000 specimens.

**DR. CLAIRE E. RUTLEDGE** taught the lecture and laboratory sections of "Insects that attack trees" for the Connecticut Tree Protective Association's Arboriculture 101 course in Wallingford (45 adult attendees) (October 15 and 22); presented a talk titled "*Cerceris fumipennis*: using a native wasp to find an invasive beetle" to the Connecticut Entomological Society in New Haven (37 adult attendees) (October 17); attended the annual meeting of the Connecticut Urban Forest Council in Plantsville, where she received "The Fred Borman Outstanding Urban Forestry Professional Award" for 2014 (October 29); and presented a poster titled "Prey diversity of *Cerceris fumipennis* in Connecticut" at the annual meeting of the Entomological Society of America in Portland, OR (November 18).

**DR. VICTORIA L. SMITH** participated in the Fall Meeting of the Cooperative Agricultural Pest Survey (CAPS) held at USDA-APHIS-PPQ offices in Wallingford (12 participants) (November 6); was interviewed concerning upcoming changes to the emerald ash borer quarantine by Patrick Skahill of WNPR Public Radio (November 17); was interviewed concerning issues facing gardeners in 2014 by Pam Weil of Connecticut Gardener Magazine (November 20);



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and participated in a meeting of the Yale Biosafety and Recombinant DNA Committee in New Haven (20 participants) (November 20).

**DR. KIMBERLY A. STONER** hosted a workshop sponsored by CAES on season extension, and introduced Jonathan Bates, speaker on "Extending the season: backyard bioshelters" at the New Haven Friends Meetinghouse in New Haven (55 attendees) (November 2); gave a talk titled "Habitat for Bees" at the annual meeting of the East Granby Land Trust held at the East Granby Library (35 attendees) (November 6); participated in a meeting of the City Farm & Garden Working Group at City Hall in New Haven (15 attendees) (November 7); gave a talk titled "Bee visitation to flowering plants on diversified vegetable farms in Connecticut" at the annual meeting of the Entomological Society of America in Portland, OR (55 attendees) (November 16); and participated in a meeting of the Southern New England Bee Assembly in Groton (November 22).

## ENVIRONMENTAL SCIENCES

**DR. JOSEPH PIGNATELLO** was Keynote speaker for the symposium, Nanoparticle Form and Fate in Soil and Water, and presented the talk, "Biochar Nanoparticles and their Interaction with Engineered Cerium Oxide Nanoparticles," at the Soil Science Society of America Annual Meeting, Long Beach CA (approximately 150 attendees) (November 2-6).

**DR. PHILIP ARMSTRONG** met with students from the Sound School and gave an overview of research within the Department of Environmental Sciences (November 13) and gave a lecture titled "Diversity of Mosquito-borne Viruses in Connecticut" to the Connecticut Entomology Society at the Yale Peabody Museum (November 21).

**MR. GREGORY BUGBEE** gave a talk entitled "Improving Soil in The Home Garden" to the Mountain Valley Garden Club in West Hartford (approx. 35 attendees) (November 3); gave a talk entitled "Management of Invasive Aquatic Plants" at the annual conference of the Connecticut Association of Inland Wetland Commissions in Wallingford (approx. 75 attendees) (November 15); and participated in the PA 12-155 Nonpoint Source Phosphorus Committee at CTDEEP in Hartford (November 20).

**DR. GOUDARZ MOLAEI** was Skype-interviewed by Fanming Shirley Wang, as part of the career exploration of the University of Toronto students by participation in the Extern Job Shadowing Program to explore career directions (November 3); attended the conference: "Lyme Borreliosis and Tick Borne Illnesses: Diagnostics, Emerging Pathogens and Avenues for New Research" in Boston (November 8-9); and hosted Alpa Patel, Lyme Care Outreach, and Stephen Arndt, Director of Lyme Care Services, My Health 1st Urgent Care Milford, CT, and discussed research on ticks and tick-borne pathogens, as well as the services offered at the CAES Tick Testing Laboratory (November 26)

**MS. ANGELA BRANSFIELD** participated in the 2014 Federal Select Agent Program Webcast (November 14).

**MS. SARYN KUNAJUKR** attended the conference: "Lyme Borreliosis and Tick Borne Illnesses: Diagnostics, Emerging Pathogens and Avenues for New Research" in Boston (November 8-9).

## FORESTRY AND HORTICULTURE

**DR. JEFFREY WARD** staffed a collaborative booth between CAES, CT-DEEP, and UConn Cooperative Extension at the Tree Care Industry Exposition in Hartford (November 14); spoke on Identification & Control of Bamboo at the CT Association of Conservation and Inland Wetlands Commissions 37th Annual Meeting in Wallingford (43 attendees) (November 15); and gave invited lecture "Improving the competitive status of oak regeneration using stand management and prescribed fires" at Wesleyan University, Middletown (26 students) (November 18).



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**DR. ADRIANA ARANGO** staffed a collaborative booth between CAES, CT-DEEP, and UConn Cooperative Extension at the Tree Care Industry Exposition in Hartford (November 15) and along with **MR. JOSEPH P. BARSKY**, gave a presentation on trees and forests to students from COOP High School in New Haven (November 20).

**MR. JOSEPH P. BARSKY** was interviewed by David Bibbey of CPTV for an upcoming segment on forestry in Connecticut (November 10) and presented a poster and staffed a collaborative booth between CAES, CT-DEEP, and UConn Cooperative Extension at the Tree Care Industry Exposition in Hartford (~2,000 attendees) (November 12).

**DR. ABIGAIL MAYNARD** was filmed in a documentary about local food production by Wesleyan students, Jaxie Friedman and Danielle Pruitt, at Lockwood Farm (November 7); spoke about the New Crops Program to students of George Baldwin from the Sound School (10 students, 1 teacher) (November 13); and advised students on their AP Biology projects at Hamden Hall Country Day School (10 students, 1 teacher) (November 20).

**DR. SCOTT WILLIAMS** participated in a conference call of the annual conference planning committee of the Connecticut Urban Forest Council. (November 18) and gave an invited talk titled "Deer Damage Management Options for the Home Gardener" to the Portland, CT Garden Club, Portland, CT (25 attendees) (November 19).



**DR. ADRIANA ARANGO** and **MR. J.P. BARSKY** discussing general concepts of tree physiology and anatomy (tree ID, core sample and DBH) to Co-Op High School students at the field site near East Rock (New Haven).



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## 2014 Connecticut-FFA Forestry Career Development Event

On November 21<sup>st</sup> the Department of Forestry & Horticulture marked its 3<sup>rd</sup> year hosting the 2014 Connecticut-FFA Forestry Career Development Event at Lockwood Farm. The Forestry Career Development Event evaluates students' knowledge of forest management practices, tree and wood products identification, forest mensuration, map reading skills and industry safety standards.

Thirty two students from 8 State FFA Chapters participated in this years' event: Woodbury FFA – Nonnewaug High School, Lyman Hall FFA – Lyman Hall High School, Southington FFA – Southington High School, Ledyard FFA – Ledyard High School, Wamogo FFA – Wamogo Regional High School, Storrs Regional FFA – E.O. Smith High School, Killingly FFA – Killingly High School and Housatonic Valley FFA – Housatonic Valley Regional High School.

The students took a 50 question exam, testing their general knowledge of forestry and the forest. They then had to identify 25 pieces of forestry related tools and equipment, followed by a 20 specimen tree identification exam and finally a forest pests identification practicum. The students were then allowed to participate in two team events; Timber Stand Improvement and Timber Volume Cruising exercises.

The 4-student team from E.O. Smith High School Agriculture Education Program finished in first place and will represent The State of Connecticut in regional and national competition at the 2015 Eastern States Exposition and 2015 National FFA Convention in Louisville, KY.

**DR. SCOTT WILLIAMS, MICHAEL SHORT, J.P. BARSKY** and **MEGAN FLOYD**, all in the Department of Forestry & Horticulture organized and oversaw the event. Former Station staff members Emily Picard and Vikki Christian were on hand as teachers. Nick Zito, former Station staff member and current Regional Water Authority Forester, assisted with tree measurements. **RICH CECARELLI**, Research Farm Manager was kind enough to let us use the cottage and barn at Lockwood Farm.





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## PLANT PATHOLOGY AND ECOLOGY

**DR. SHARON M. DOUGLAS** participated in the fall meeting of the Connecticut CAPS program held at the USDA-APHIS-PPQ facility in Wallingford and discussed the *Phytophthora ramorum* survey protocol for 2015 and testing for phytoplasmas (apple proliferation) (12 attendees) (November 6); organized and welcomed George Baldwin's senior Genetics & Biotechnology class from the Sound School to CAES for a tour to hear about the diverse research being conducted at CAES (14 attendees) (November 13); participated in a meeting of the CTPA Board to discuss and review proposed changes to the CTPA website at CTPA Headquarters in Wallingford (November 20); and was interviewed by Pamela Weil regarding a synopsis of problems experienced by Connecticut gardeners for the 2014 growing season, with particular interest in the first molecular detection of rose rosette virus in Connecticut (November 21).

**DR. WADE H. ELMER** and **MR. PETER THIEL** joined Dr. Kenneth Raposa (Narragansett Bay Research Reserve) and Dr. Cathy Wigand (EPA) on Prudence Island, RI in Narragansett Bay where Sudden Vegetation Dieback had occurred and participated in monitoring and sampling dieback sites (November 12); and gave a presentation on Sudden Vegetation Dieback to the Sound School in the Board Room (12 students attended) (November 14).

**DR. FRANCIS J. FERRANDINO** participated in the annual meeting of the NE1020 project "Multi-state Evaluation of Winegrape Cultivars and Clones" in Geneva, NY and presented results of trials from Connecticut (November 10-12).

**DR. YONGHAO LI** gave an invited talk titled "Plant Quarantine Regulations in the United States" for students, faculty, and staff at Northeast Agricultural University in Harbin, China (50 attendees) (November 24).







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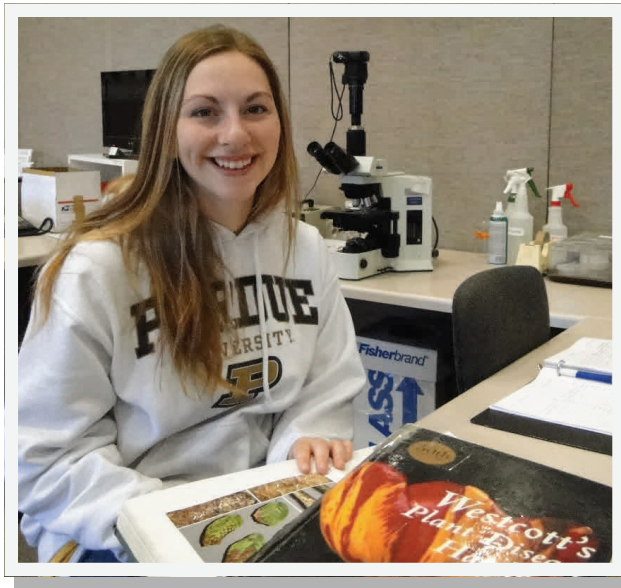
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## NEW STAFF MEMBERS – PLANT PATHOLOGY AND ECOLOGY

**DR. QUAN ZENG** started his position as Assistant Scientist II in the Department of Plant Pathology and Ecology in November. He recently completed postdoctoral training in Dr. George Sundin's lab at Michigan State University where he studied fire blight, a bacterial disease of fruit trees. Quan earned his Ph.D. in 2011 at the University of Wisconsin-Milwaukee where he studied bacterial soft rot disease of potato and vegetables under Dr. Ching-Hong Yang. His research at CAES focuses on fire blight of fruit trees and etiolation disease of turfgrass. Using molecular and genomic tools, he aims to understand virulence mechanisms of pathogens and develop novel disease management options. He lives in East Haven with his wife Lindsay and his dog Sunny, and enjoys playing and watching basketball, hiking, and traveling.



**MS. LINDSAY A. PATRICK** began her position as Agricultural Technician I in the Plant Disease Information Office at the beginning of November. While attending Purdue University for her MS in entomology, she worked with Dr. Matthew Ginzel on the effects of grafting various ash species to increase resistance to the emerald ash borer. Upon graduation in May 2014, Lindsay joined the Simsbury Bartlett Tree Experts office as a plant health care specialist. In the PDIO, she is currently assisting with seed testing and learning more about plant pathogens each day. She lives in Marlborough with her husband Corey, and enjoys hiking, bowling, and reading.





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## VALLEY LABORATORY

**DR. RICHARD COWLES** presented “Insect and mite pests of landscape ornamentals, Part I” and “Insect and mite pests of landscape ornamentals, Part II” on Nov. 7 and 14, respectively, for the University of Massachusetts Green School, Marlboro, MA (100 participants) (November 7 and 14). He presented “Neonicotinoids and bee health” (coauthor, David Smitley, Michigan State University) to the Tree Care Industry Association Expo, Hartford (150 participants) (November 13) and spoke on “Behavioral control and mass trapping: Lessons learned in blueberries” (coauthors Steven Alm, and Heather Faubert, Univ. Rhode Island) for a spotted wing dro-sophila symposium at the Entomological Society of America National Meeting in Portland, OR, (120 participants) (November 18).

**DR. JAMES LAMONDIA** was interviewed about research and services at the Valley Laboratory by Eric Stecker of the Windsor Journal Weekly Newspaper (November 19) and was interviewed by Dale and Darcy Cahill for the tobacco oral history project for the Library of Congress (November 25).



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## DEPARTMENTAL RESEARCH UPDATES NOVEMBER 2014

### ADMINISTRATION

**Andreadis, T. G., Anderson, J. F., Armstrong, P. M.** and Main, A. J. 2014. Spatial-temporal analysis of Cache Valley virus (Bunyaviridae: *Orthobunyavirus*) infection in Anopheline and Culicine mosquitoes (Diptera: Culicidae) in the northeastern United States, 1997 – 2012. *Vector-Borne Zoonotic Dis.* 10:763-773.

**Abstract:** Cache Valley (CV) virus is a mosquito-borne bunyavirus (family *Bunyaviridae*, genus *Orthobunyavirus*) that is enzootic throughout much of North and Central America. White-tailed deer, *Odocoileus virginianus* have been incriminated as important reservoir and amplification hosts and the virus has been found in a diverse array of mosquito species but the principal vectors are unknown. A 16-year study was undertaken to identify the primary mosquito vectors in Connecticut, quantify seasonal prevalence rates of infection and define the spatial geographic distribution of CV virus in the state as a function of land use and white-tailed deer populations which have increased substantially over this period. CV virus was isolated from 16 mosquito species in 7 genera, almost all of which were multivoltine and mammalophilic. *Anopheles punctipennis* was incriminated as the most consistent and likely vector in this region based on yearly isolation frequencies and the spatial geographic distribution of infected mosquitoes. Other species exhibiting frequent temporal and moderate, spatial geographic patterns of virus isolation within the state included *Ochlerotatus trivittatus*, *Oc. canadensis*, *Aedes vexans* and *Ae. cinereus*. New isolation records for CV virus were established for *An. walkeri*, *Culiseta melanura*, and *Oc. cantator*. Other species from which CV virus was isolated included *An. quadrimaculatus*, *Coquillettidia perturbans*, *Culex salinarius*, *Oc. japonicus*, *Oc. sollicitans*, *Oc. taeniorhynchus*, *Oc. triseriatus* and *Psorophora ferox*. Mosquitoes infected with CV virus were equally distributed throughout urban, suburban and rural locales, and infection rates were not directly associated with the localized abundance of white-tailed deer possibly due to their saturation throughout the region. Virus activity in mosquitoes was episodic with no consistent pattern from year to year and fluctuations in yearly seasonal infection rates did not appear to be directly impacted by overall mosquito abundance. Virus infection in mosquitoes occurred late in the season that mostly extended from mid-August through September when adult mosquito populations were visibly declining and were comparatively low. Findings argue for a limited role for vertical transmission for the perpetuation of CV virus as occurs with other related bunyaviruses.

### ENTOMOLOGY

**Rutledge, Claire E., Silk, Peter J., and Mayo, Peter.** 2014. Use of contact chemical cues in prey discrimination by *Cerceris fumipennis*. *Entomologia Experimentalis et Applicata* 153 (2):93-105. (DOI: 10.1111/eea.12233)

**Abstract:** *Cerceris fumipennis* Say (Hymenoptera: Crabronidae) uses a wide range of adult buprestid beetles to provision nests. Wasps seldom make ‘mistakes’ and attack beetles in other families. Bioassays showed that the wasps use contact chemical cues in the beetles’ epicuticle to discriminate buprestids from other beetles. Wasps rejected buprestids that had their cuticular hydrocarbons (CHC) removed by being washed in solvents. The washed, rejected buprestids became acceptable to 70% of wasps when they were coated with an extract of buprestids’ own CHC. Washed buprestids coated with extracts of non-buprestid beetle CHC were not accepted. Analyses of buprestid CHC profiles showed that they are relatively simple, consisting of five classes. Other coleopteran families that may co-occur in the arboreal hunting habitat of *C. fumipennis* have a broader range of CHC classes. Experiments adding buprestid hydrocarbons to a non-buprestid beetle, unwashed *Popillia japonica* Newman (Coleoptera: Scarabaeidae), suggested that wasps may be deterred by the presence of CHC classes not found in Buprestidae. Adding a synthesized dimethyl-branched hydrocarbon, a class of CHC found in Chrysomelidae but not Buprestidae, to the cuticle of unwashed buprestid beetles, caused wasps to reject the buprestid beetles. We propose that CHC act as a kairomone for *C. fumipennis*, triggering attack, whereas classes of CHC not found in Buprestidae disrupt this response, and thus help to determine the prey range of the wasp.



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## ENVIRONMENTAL SCIENCES

Krajacich BJ, Slade JR, Mulligan RF, LaBrecque B, Alout H, Grubaugh ND, Meyers JI, Fakoli LS, Bolay FK, **Brackney DE**, Burton TA, Seaman JA, Diclaro JW 2nd, Dabiré RK, Foy BD. 2014. Sampling host-seeking anthropophilic mosquito vectors in West Africa: comparisons of an active human-baited tent-trap against gold standard methods.

*American Journal of Tropical Medicine and Hygiene* Nov 24. pii: 14-0303.

**Abstract:** In this study, we characterize the ability of the previously described Infoscitex tent (IST) to capture mosquitoes in comparison to either the Centers for Disease Control Light Trap hung next to individuals under a bed net (LTC) or to human landing catches (HLC). In Senegal, the IST caught 6.14 times the number of *Anopheles gambiae sensu lato* (s.l.), and 8.78 times the *Culex* group V mosquitoes as LTC. In one of two locations in Burkina Faso, the IST caught *An. gambiae* at a rate not significantly different than HLC. Of importance, 9.1-36.1% of HLC caught *An. gambiae* were blood fed, mostly with fresh blood, suggesting they fed upon the collector, whereas only 0.5-5.0% from the IST had partial or old blood. The IST also caught outdoor biting species in proportions comparable to HLC. The results show this tent provides a safer and effective alternative to the skill-dependent, risky, and laborious HLC method.

Alout H<sup>1</sup>, Krajacich BJ, Meyers JI, Grubaugh ND, **Brackney DE**, Kobylinski KC, Diclaro JW 2nd, Bolay FK, Fakoli LS, Diabaté A, Dabiré RK, Bougma RW, Foy BD. Evaluation of ivermectin mass drug administration for malaria transmission control across different West African environments. 2014. *Malaria Journal* 13:417. doi: 10.1186/1475-2875-13-417.

**Abstract:** Mass drug administration (MDA) of ivermectin to humans for control and elimination of filarial parasites can kill biting malaria vectors and lead to *Plasmodium* transmission reduction. This study examines the degree and duration of mosquitocidal effects resulting from single MDAs conducted in three different West African countries, and the subsequent reductions in parity and *Plasmodium* sporozoite rates. Indoor-resting, blood-fed and outdoor host-seeking *Anopheles* spp. were captured on days surrounding MDAs from 2008-2013 in Senegalese, Liberian and Burkinabé villages. Mortality was assessed on a portion of the indoor collection, and parity status was determined on host-seeking mosquitoes. The effect of MDA was then analysed against the time relative to the MDA, the distributed drugs and environmental variables. *Anopheles gambiae* survivorship was reduced by 33.9% for one week following MDA and parity rates were significantly reduced for more than two weeks after the MDAs. Sporozoite rates were significantly reduced by >77% for two weeks following the MDAs in treatment villages despite occurring in the middle of intense transmission seasons. These observed effects were consistent across three different West African transmission dynamics. These data provide a comprehensive and crucial evidence base for the significant reduction in malaria transmission following single ivermectin MDAs across diverse field sites. Despite the limited duration of transmission reduction, these results support the hypothesis that repeated MDAs with optimal timing could help sustainably control malaria as well as filarial transmission.

## PLANT PATHOLOGY AND ECOLOGY

**Elmer, W. H.** 2014. Asparagus. Pages 137-150, in: *Diseases of Temperate Horticultural Plants*. R. A. T. George and R. Fox (Editors), CABI Press.

**Abstract:** The chapter summarizes the major diseases of asparagus: *Fusarium* crown and root rot, asparagus rust, *Stemphyllium* blight, *Phytophthora* blight, anthracnose, and *Botrytis* along with viral diseases. Each disease is divided into sections on the disease, the pathogen, and management.

**Elmer, W. H., Lattao, C., and Pignatello, J. J.** 2014. Active removal of biochar by *Lumbricus terrestris* L. *Pedobiologia* doi:10.1016/j.pedobi.2014.11.001.

**Abstract:** The role earthworms play in the cycling of biochar in the soil column is poorly understood. While some studies show that earthworms favor a biochar-rich environment, they are ambiguous as to whether earthworms actively remove it and/or possibly consume it, or whether biochar indirectly provides a more favorable habitat. More importantly, associating the proper-



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ties of different biochars to habitat preference by earthworms has received almost no attention. Courts were established with eight biochars from different feedstocks with varying physicochemical properties. Circular piles (1.5 g) of biochar were applied to the surface of mesocosms containing field soil and 25 earthworms. Removal was quantified by digitally photographing the biochar samples and visually estimating disappearance over time. Most biochars were actively removed by the earthworms. The most preferred biochar was an aged biochar (>70 years) harvested from charcoal mounds, whereas the least preferred was a fast-pyrolysis biochar made from hardwood sawdust. There was an inverse relationship between the removal of biochar by earthworms and total carbon and a proportional increase with the contents of ash, Ca, Mn, and Si, although the correlations were not strong and may not explain earthworm preference. Other physicochemical properties of the biochars, such as the % volatile C, % H, porosity, and cumulative surface area, were associated with increased aerobic bacteria and fluorescent pseudomonads in soil, but not associated with biochar removal by earthworms. More research is needed to determine if tailoring specific biochars for surface removal by earthworms could be achieved by supplementing biochar with Ca, Mn, and Si and thus lead to a non-disruptive system for delivery of biochar into lower soil horizons of perennial crops. More importantly, this procedure may be useful in screening biochars for attractiveness to earthworms.

## JOURNAL ARTICLES APPROVED NOVEMBER 2014

- Brown, Heidi E., A. Young, J. Lega, **Theodore G. Andreadis**, J. Schurich, and A. Comrie. Climate change influences on West Nile virus vectors in the northern U.S. *Earth Interactions*
- Egan, Cameron, **De-Wei Li**, J. Klironomos. Detection of arbuscular mycorrhizal fungal spores in the air. *Fungal Ecology*
- Hayes, Laura E.**, J. A. Scott, and **Kirby C. Stafford, III**. Winter weather as a predictor of annual *Ixodes scapularis* nymphal densities at long-term study sites in Connecticut. *Ticks and tick-borne Diseases*
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