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.

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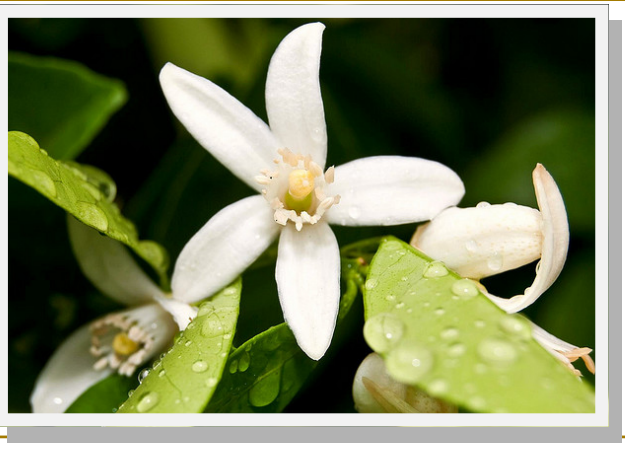
Departmental News



DEPARTMENTAL NEWS

ADMINISTRATION

DR. THEODORE ANDREADIS with **MR. MICHAEL LAST** and **DR. JASON WHITE** gave a presentation on the Governor's FY 2016-2017 for the Experiment Station to the State Appropriations Committee in Hartford (March 2); attended a CAES sponsored Forest Health Monitoring Workshop held in Burlington (50 attendees); attended Ag Day at the State Capital in Hartford (March 18); attended a Board meeting of the Experiment Station Associates (March 18); provided opening remarks on the Experiment Station to a meeting of the State Landscape Design School (March 24); and with **MR. MICHAEL LAST** testified before the Finance, Revenue and Bonding Subcommittee in Hartford.

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 (March 1); along with **DR. BRIAN EITZER, DR. CHRISTINA ROBB, DR. WALTER KROL, MS. KITTY PRAPAYOTIN-RIVEROS, DR. ROBERTO DE LA TORR-ROCHE, DR. ALIA SERVIN, DR. ARNAB MUKHERJEE, DR. SANGHAMITRA MAJUMDAR, MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, MR. CRAIG MUSANTE, MR. JOHN RANCIATO AND MS. TERRI ARSENAULT** participated in the FDA ISO Accreditation Quarter 2 teleconference call (March 2); attended the SUN-SNO-GUIDEnano Sustainable Nanotechnology Conference in Venice Italy and gave a presentation entitled "Trophic transfer of engineered nanomaterials in terrestrial food chains" (40 attendees) and chaired a plenary panel discussion on "Nanotechnology in Food and Agriculture (75 attendees) (March 9-11); was an invited participant in the 2015 EU-US Bridging NanoEHS Research Efforts Joint Workshop in Venice Italy (March 12-13) and gave a presentation to the Ecotoxicity Testing Community of Research (CoR) entitled "Nanomaterial exposure assessment studies at the CT Agricultural Experiment Station" (15 attendees); participated in a teleconference call with colleagues from Carnegie Mellon University, Binghamton University and the Sustainable Nanotechnology Organization about preparation of a joint NSF Conference Proposal (March 17); along with **DR. WALTER KROL** participated in a teleconference call with colleagues at the University of CT Center for Environmental Science and Engineering regarding a joint project on the detection of pesticides in lobster tissues (March 17); was an invited participant in the University of California Los Angeles (UCLA) Center for the Environmental Implications of Nanotechnology (CEIN) workshop on "Implementing environmentally relevant exposures for improved interpretation of laboratory toxicology studies of manufactured and engineered nanomaterials" and gave a presentation of the same title (30 attendees); along with **MS. KITTY PRAPAYOTIN-RIVEROS** participated in a FDA MFRPS pre-audit teleconference call with the CT Department of Consumer Protection (March 24); along with **MR. CRAIG MUSANTE** participated in a teleconference call with colleagues at the Arkansas Department of Public Health regarding validation an ICP-MS protocol for arsenic determination in juice (March 25); participated by teleconference in the *Environmental Science & Technology* and *Environmental Science & Technology Letters* annual Editorial Advisory Board meeting (March 25); and along with **DR. BRIAN EITZER** hosted a visit with Michael Rickenbach, Robert Lockwood, and Anuja Bharadwaj of the Chemistry Section of the State of CT - Department of Emergency Services & Public Protection to discuss high resolution liquid chromatography/mass spectrometry (March 26).

DR. BRIAN EITZER, was a judge at the Connecticut Science & Engineering Fair held at Quinnipiac University in Hamden, CT (March 11-12); was a participant in phone calls on the development of an LC/MS class for the FDA in which he will be an instructor (March 18 and March 30); was involved in conference calls on planning the upcoming meeting of the North American Chemical Residue Workshop (March 5, March 30); and along with **DR. RICHARD COWLES** of the Valley Laboratory was a recipient of a $54,000 grant from the Horticultural Research Institute of a grant to study neonicotinoid pesticides model plant systems.

DR. CHRISTINA ROBB gave a presentation titled "Screening the food supply: routinely and in emergencies" to the Sigma Xi seminar series at Quinnipiac University in Hamden, CT (30 attendees) (March 24).

DR. WALTER KROL along with **MR. MICHAEL CAVADINI** and **MS. TERRI ARSENAULT** attended the 4th Annual Manufactured Food Regulatory Alliance (MFRPA) Meeting and annual FDA ISO Accreditation Face-to-Face meeting in San Diego CA (March 10-12).

MS. KITTY PRAPAYOTIN-RIVEROS, attended the 4th Annual Manufactured Food Regulatory Alliance (MFRPA) & Governmental Food and Feed Laboratories Accreditation Meeting in San Diego CA and received 13 credits from Professional Acknowledgement for Continuing Education (P.A.C.E) by Association of Public Health Laboratories (APHL) (March 10-12); and has participated in the educational activity entitled "Integrating Measuring and Monitoring for Effective Lab Improvements" and received 6.5 credits from P.A.C.E by APHL in Silver Spring MD (March 19).

MR. MICHAEL CAVADINI, along with **MR. GREGORY BUGBEE** proctored three entomology exams for the CT Science Olympiad (~30 middle school participants) (March 21).

ENTOMOLOGY

DR. KIRBY STAFFORD III spoke on firewood regulations at the Forest Health Workshop in Burlington (60 attendees) (March 3); participated on the tick IPM conference call (March 11); spoke on ticks and Lyme disease at the Branford Land Trust (45 attendees) (March 24); participated in a conference call with US Biologic, Inc. about summer research plans for the rodent Lyme vaccine (March 27); attended the meeting of the Connecticut Entomological Society in Storrs (March 27); and was interviewed about Southern pine beetle by Judy Benson for The Day (March 31).

MR. MARK CREIGHTON attended a talk presented by Dr. Maria Spivak on the value of honey bees and pollination in Worchester, MA (March 7); attended a meeting at Rockville Agricultural Center to help plan an apiary at the school (March 9); submitted a USDA Specialty Crop Block Grant Concept Proposal to CTDA, titled Minority/ Youth Beekeeping Initiative (March 10); spoke about bees and the role they play in pollination to 3rd grade students at East Conn in Hampton (124 youths attended) (March 11); assisted **DR. KIRBY C. STAFFORD III** on a section 18 emergency exemption under Section 18 of FIFRA for the use of Hopguard II for Varro mite control (March 12); attended a lecture by Dr. Dave Tarpy on the reasons for queen failure in Topsfield, MA (March 14); attended a meeting with the ACO and Zoning Officer in Ansonia on proposed restrictions on beekeeping (March 19); spoke on the role that bees play in pollination to students at Andover Elementary School (70 youths attended) (March 24); was notified that a USDA Specialty Crop Block Grant Concept Proposal to CTDA, titled Minority/Youth Beekeeping Initiative was selected for Phase two: full application (March 24); attended a Pollinator Health workshop held at UMass in Amherst, MA (March 26); and with **DR. KIRBY C. STAFFORD III**, was advised by EPA that our Section 18 emergency exemption under Section 18 of FIFRA for the use of Hopguard II for Varro mite control was approved by the U.S. Department of Environmental Protection (March 31).

MS. KATHERINE DUGAS gave a short update on the 2014-2015 CAPS program as well as the upcoming surveys funded through the Farm Bill at the Forest Health Workshop held at the Sessions Woods Wildlife Management Area in Burlington (60 attendees) (March 3); invited six members of the Old Lyme Middle School Science Olympiad Entomology team to come tour the Insect Inquiry Office and Dr. Claire Rutledge's Cerceris lab in the Jenkins-Waggoner building (March 10); and staffed a table and handed out information on forest pests such as the Asian longhorned beetle and emerald ash borer at the CT Master Gardener Symposium held at Manchester Community College (150 people visited the table) (March 21).

DR. CHRIS MAIER spoke about "Alien insects lurking in or near Connecticut forests" at the Forest Health Monitoring Workshop at Sessions Woods in Burlington (60 attendees) (March 3); and attended a meeting of the Connecticut Entomological Society at the University of Connecticut in Storrs (March 27).

DR. GALE RIDGE was a guest in a live radio broadcast about bed bugs with Larry Rifkin of WATR in Waterbury (January 6); spoke about bed bug management in senior housing to the Susan B. Perry senior community in Winsted (40 attendees) (March 16). Upon their request, she followed up by writing bed bug pest management protocols for the community.

Southern pine beetle (SPB) (left - picture by Dr. Gale Ridge) and SPB trapped in "popcorn" pitch tube on Scots pine in Naugatuck State Forest (right - picture by Dr. Adriana Arango).

On March 19, Dr. Ridge identified the Southern pine beetle *Dendroctonus frontalis* Zimmermann, found in red pine from Wharton Brook State Park, on the North Haven/ Wallingford town line, and collected by **DR. CLAIRE RUTLEDGE** on March 17. This is a new State record. It is a bark beetle of concern, since it is a destructive pest of pine in the Southern United States. Dr. Ridge participated in a national EPA webinar focusing on bed bugs and school environments (March 19). Six type and cotype slide mounts of mites identified by Garman were loaned to Dr. Salvatore Ragusa at the Laboratori Acarologia Applicata in Palermo, Italy, to assist in a revision of a group of mites of which these are a part. These are part of the holdings of the insect collection (March 23). Dr. Ridge presented a lecture on bed bugs at Southern Connecticut State University (90 attendees) (March 25); was interviewed by a reporter from the Record Journal about the discovery of a dead caterpillar in processed pears found by a student at Wallingford High School (March 25); gave a talk about bed bugs to the Capital Region Mental Health Center in Hartford (27 attendees) (March 31); and gave a talk about bed bugs to the Department of Developmental Services via webcast, in Wallingford (Statewide) (March 31).

DR. CLAIRE RUTLEDGE taught "Insect Conditions Laboratory" for the Connecticut Tree Protective Association's Arboriculture 101 course in Wallingford (45 adult attendees) (March 11); gave a lecture titled "Little trees get eaten too: insects and mites attacking bonsai" for the Greater Hartford Area Bonsai Club in Wethersfield (16 adult attendees) (March 16); and gave a lecture titled "Using a native wasp to find an invasive beetle" for the Master Gardener course in Haddam (40 adult attendees) (March 31).

DR. VICTORIA SMITH organized the annual Forest Health Workshop, held at Sessions Woods Wildlife Management Area in Burlington, and presented a talk titled "Southern Pine Beetle and Cynipid Gall Wasp—Two New Players" (60 participants) (March 3); and participated in a meeting of the Yale Biosafety Committee in New Haven (20 participants) (March 19).

DR. KIMBERLY STONER met with the directors of New Haven Urban Agriculture Organizations (Common Ground School and Environmental Center, New Haven Land Trust, New Haven Farms, and CitySeed) to explore ways for the organizations and the Experiment Station to work together (March 3); spoke to the Perennial Plant Conference on "Growing plants that are good for bees" at the University of Connecticut in Storrs (125 attendees) (March 5); met with the City Farm and Garden Working Group at City Hall in New Haven (March 6); was interviewed about the current status of native pollinators by Alan Bjerga of Bloomberg News (March 6); spoke on "Growing plants that are good for bees" at the CT NOFA Winter Conference at Western Connecticut State University in Danbury (65 attendees) (March 7); spoke on "Growing plants that are good for bees" at the annual planning meeting of the Shelton Community Garden at City Hall in Shelton (35 attendees) (March 9); spoke on "Making a habitat for bees" to the New Hartford Land Trust at the New Hartford Town Hall (75 attendees) (March 15); participated in the Steering Committee meeting for the New England Vegetable and Fruit Conference in Goffstown, NH (25 attendees) (March 19); and spoke on "Neonicotinoids in agriculture and landscapes: do they harm honey bees or native bees?" at the University of Massachusetts Extension Symposium on Pollinator Health for Agriculture and Landscapes in Amherst, MA (268 attendees) (March 26).

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO gave a keynote lecture, "Interactions and Reactions of Organic Compounds at Interfaces between Water and Pyrogenic Carbonaceous Materials", and a volunteered lecture, "Sunlight-Driven Photochemical Halogenation of Dissolved Organic Matter in Seawater: A Natural Abiotic Source of Organobromine and Organoiodine", at the 249th American Chemical Society National Meeting in Denver, CO (March 22-26; 100 and 50 attendees, respectively).

DR. GOUDARZ MOLAEI hosted two members of the Pennsylvania Department of Environmental Protection for a one-day training on mosquito blood meal analysis (March 11); and along with **MS. SARYN KUNAJUKR**, presented an invited talk to the Western Connecticut Council of Governments Tick Borne Illness Prevention Task Force (joint meeting of the Lyme Registry, Danbury Hospital and Health Departments) where they also discussed research on ticks and tick-borne pathogens, as well as changes to CAES Tick Testing Program (23 attendees) (March 18).

DR. CHARLES VOSSBRINCK served as judge in the Sustainability category at the Connecticut State Science Fair held at Quinnipiac University (March 12).

DR. PHILIP ARMSTRONG along with **JOHN SHEPARD** and **MICHAEL THOMAS** conducted hands-on workshops on mosquito biology to a group from RHAM High School (23 students and 5 adults) (March 3); and to a group from Ansonia Middle School (27 students and 3 adults) (March 31) as part of the Yale-Peabody Fellows SEPA NIH program on mosquito biology.

MR. JOHN SHEPARD participated in a Board of Directors meeting of the Northeastern Mosquito Control Association in Falmouth, MA (10 attendees) (March 13).

DR. BLAIRE STEVEN gave an invited lecture "A microbial Ecological View Including Soil Fluxes in Climate Models" at the Yale Eco lunch of the Yale School of Forestry and Environmental Studies (20 attendees) (January 26); and visited Drs. Julie Rose and Lisa Milke of the National Oceanic and Atmospheric Administration, Northeast Fisheries Science Center in Milford to discuss possible collaborations in studying the environmental effects of oyster cultivation practices on greenhouse gas fluxes (March 3).

MR. GREGORY BUGBEE lectured on "Improving Soil in the Home Garden" to gardeners in the Derby area as part of a United Way campaign to improve the diets of inner city residents through gardening (25 attendees) (March 26); with Michael Cavadini, proctored the Entomology event at the Connecticut Science Olympiad in Farmington (40 attendees) (March 21); gave a seminar entitled "Soil Science for Arborists" at the Bartlett Arboretum in Stamford (12 attendees) (March 17); and with **MS. JENNIFER FANZUTTI,** presented a poster entitled "Connecticut's Invasive Aquatic Plant Program" at the Connecticut Conference on Natural Resources at the University of Connecticut, Storrs (200 attendees) (March 16).

FORESTRY AND HORTICULTURE

DR. JEFFREY WARD spoke on "Engaging private forest owners to promote forest health and biodiversity" at the Forest Health Monitoring Workshop in Burlington (60 attendees) (March 3); met with Marty Rodskoch to discuss CCC and forest history (March 6); administered practical and oral examination to arborist candidates for the Connecticut Tree Protection Examining Board (March 11); along with **DR. ADRIANA ARANGO VELEZ** and **J.P. BARSKY**, answered questions about CAES research and outreach at Ag Day at the Capitol (March 18); interviewed about the effect of the deep snow on forest health by Judy Benson of the New London Day (March 18); spoke on "Non-traditional pests – how deer and interfering species hamper forest regeneration" at the annual winter meeting of the New England Society of American Foresters in Fairlee, VT (80 attendees) (March 25); moderated session "Silviculture II: Uneven-aged northern hardwood management for small family woodlots" at the annual winter meeting of the New England Society of American Foresters in Fairlee, VT (200 attendees) (March 25-26); attended annual winter meeting of the New England Society of American Foresters in Fairlee, VT (March 25-26); participated in an Executive Board meeting of the Connecticut Urban Forest Council in Middlefield (March 27); interviewed about the effect of the lingering snow on agriculture by Dana Whalen of WTIC 1080 radio (March 27); and spoke on invasive species control for a graduate forestry class at Yale University (March 31).

DR. ADRIANA ARANGO VELEZ presented "Topics in Urban Forestry" to the Botany Club students from the Southern Connecticut State University (12 undergrad students and the Botany class teachers) (March 13) and spoke on "Proper tree care and maintenance, and management of invasive species" at the City of Bridgeport Parks and Recreation Department and CUFC tree planting workshop in Bridgeport. About 13 people attended this workshop 4 from the Hispanic community (March 21).

DR. MARTIN P.N. GENT presented a report on "Effects of Salinity and Irrigation Management on Poinsettia" at the NE1335 regional research committee meeting on 'Resource Management in Commercial Greenhouse Production' in Tucson, AZ (8 attendees) (March 28).

DR. ABIGAIL MAYNARD spoke on "Unusual Garden Vegetables" to the North Haven Garden Club (37 adults) (March 12); spoke about the New Crops Program to the Botany Club from Southern Connecticut State University (15 students, 1 teacher) (March 13); and visited the Medlyn Farm in Branford (March 16).

DR. SCOTT WILLIAMS attended the Connecticut Conference on Natural Resources at University of Connecticut, Storrs (March 16); met with Dr. Morty Ortega from the Department of Natural Resources and the Environment, University of Connecticut to discuss collaborative research opportunities (March 19); and participated in the Executive Board meeting of the Connecticut Urban Forest Council, Middlefield (March 27).

MR. JOSEPH P. BARSKY attended the Forest Health Monitoring Workshop at Sessions Woods Wildlife Management Area, Burlington (March 3); participated in the Lyman Hall AgriScience Consulting Committee Meeting in Wallingford (March 16); selected to serve as Editor of the "News Quarterly" for the New England Society of American Foresters (March 25); and presented research poster "Integrating forest and roadside management objectives to create storm resilient forests" at the 95th Annual winter meeting of the Society of American Foresters in Fairlee, VT (75 attendees) (March 26).

Drs. LaMondia and Ward discussing agricultural research with Governor Dannel Malloy at Ag Day at the Capitol.

Seasonal Resource Assistants Ms. Jamie Cantoni and Ms. Amanda Massa with CAES display at Ag Day at the Capitol.

GRISWOLD RESEARCH CENTER

MR. ROBERT DURGY attended as a member of the steering committee and ran the audio-visuals at the Connecticut Vegetable and Small Fruit Grower's Conference in Windsor (305 attendees) (January 15); taught a University of Connecticut Master Gardener Program class on vegetables in Stamford (34 attendees) (February 16), in Brooklyn (26 attendees) (February 20), in West Hartford (43 attendees) (February 25), in Haddam (46 attendees) (March 3), and in Bethel (44 attendees) (March 12); taught Math Calculations and Calibration for Pesticide Applicator's Training in East Haven (38 attendees) (February 5) and in West Hartford (34 attendees) (February 24); gave a lecture entitled Backpack Sprayer Calibration in East Windsor (60 attended) (February 19); gave a lecture entitled Understanding Fertilizers in Norwich (15 attended) (March 7).

PLANT PATHOLOGY AND ECOLOGY

DR. DONALD AYLOR participated as a judge for the Finalist High School Physical Sciences projects at the Connecticut Science Fair at Quinnipiac University in Hamden (contacts with 22 youths and 10 adults) (March 12).

DR. WADE ELMER attended the Connecticut Conference for Natural Resources at UConn in Storrs where his graduate student Magali Bazzano presented a portion of her MS thesis "Use of DMSP as an indicator of stress in *Spartina alterniflora* in salt marshes affected by SVD" (17 attendees) (March 16); and presented a lecture titled "Biochar, soil health, and plant nutrition for management of plant diseases" to the Bartlett Tree Co. at the Bartlett Arboretum in Stamford (36 attendees) (March 25).

DR. FRANCIS FERRANDINO attended the Connecticut Wine Council meeting in Hartford (March 19).

DR. YONGHAO LI was interviewed about whether we can expect anything different this spring due to the harsh winter by Dana Whalen of WTIC Radio in Farmington (March 2); gave a talk titled "Fungal diseases associated with spruce decline" at the Forest Health Monitoring Workshop at Sessions Woods in Burlington (60 attendees) (March 3); spoke about "Organic management of vegetable diseases" at CT NOFA's 33rd Annual Winter Conference in Danbury (43 attendees) (March 7); staffed the "Hands-on" table with tree diseases for Arboriculture 101 in Wallingford (36 attendees) (March 11); with **MS. LINDSAY A. PATRICK**, spoke about the Plant Disease Information Office for a visiting group from Southern Connecticut State University Botany Club in New Haven (13 attendees) (March 13); and was interviewed about white pine blister rust by Glenn Rosenholm, the public affairs specialist at the USDA Forest Service in New Hampshire (March 13).

MS. LINDSAY PATRICK, with **DR. YONGHAO LI**, spoke about the Plant Disease Information Office for a visiting group from Southern Connecticut State University Botany Club in New Haven (13 attendees) (March 13).

DR. ROBERT MARRA presented a talk titled "Assessing internal decay in trees nondestructively with tomography" at the Forest Health Monitoring Workshop, held at Sessions Woods Wildlife Management Area, in Burlington (60 attendees) (March 3); and was an invited speaker at the 53rd Annual Minnesota Shade Tree Short Course, a conference for tree care professionals, sponsored by the Minnesota Society of Arboriculture and the University of Minnesota Continuing Education Program. Dr. Marra's seminar titled "Drought and its impact on tree health" was presented on both days (1,200 attendees) (March 17-18).

DR. LINDSAY TRIPLETT gave an invited talk titled "Resistance to African bacterial leaf streak in an American heirloom rice variety" to the Department of Plant Pathology and Plant-Microbe Biology at Cornell University in Ithaca, NY (40 attendees, 10 phoned in from the Geneva campus) (March 18). The visit included meetings with 8 Cornell professors, and lunch and dinner with groups of graduate students.; and participated in a workday at Celentano Magnet School where 12 volunteers helped the 5th grade teachers build a planter garden for plant science lessons (March 28).

VALLEY LABORATORY

DR. CAROLE CHEAH managed a booth with Elizabeth Young for the CAES with displays and information on biological control of hemlock woolly adelgid and mile-a-minute weed for the Town of Windsor Earth Day at the Windsor Town Hall (40 people) (April 22); and was interviewed by reporter Willard Wood, of Norfolk Now, regarding assessments on hemlock woolly adelgid winter 2015 mortality in Norfolk and Salisbury regions (April 30).

DR. RICHARD COWLES presented "Neonics and bees: What does the science say?" to Monrovia Nursery managers, Granby, (20 attendees) (April 23).

DR. JAMES LAMONDIA spoke about boxwood blight biology and management to attendees of the Central Plant Board Meeting held in Lincoln NE (70 people) (April 15); participated in a meeting of the Connecticut Agricultural Information Council at the Valley Lab (April 28); and spoke about research on management of tobacco pathogens including poty viruses, black shank, target spot and blue mold fungicide resistance, and spoke about the CORESTA pesticide residue program and strategies to reduce pesticide residues in wrapper leaves in Windsor Locks (100 people) (April 29).

DEPARTMENTAL RESEARCH UPDATES MARCH 2015

Servin, A.; **Elmer, W.**; **Mukherjee, A.**; **De la Torre-Roche, R.**; Hamdi, H.; **White, J.C.**; Bindraban, P.; Dimkpa, C. 2015. A review of the use of engineered nanomaterials to suppress plant disease and enhance crop yield. *J. Nano. Res*. DOI:10.1007/s11051-015-2907-7.

ABSTRACT: Nanotechnology has the potential to play a critical role in global food production, food security and food safety. The applications of nanotechnology in agriculture include fertilizers to increase plant growth and yield, pesticides for pest and disease management, and sensors for monitoring soil quality and plant health. Over the past decade, a number of patents and products incorporating nanomaterials into agricultural practices (e.g., nanopesticides, nanofertilizers, and nanosensors) have been developed. The collective goal of all of these approaches is to enhance the efficiency and sustainability of agricultural practices by requiring less input and generating less waste than conventional products and approaches. This review evaluates the current literature on the use of nanoscale nutrients (metals, metal oxides, carbon) to suppress crop disease and subsequently enhance growth and yield. Notably, this enhanced yield may not only be directly linked to the reduced presence of pathogenic organisms, but also to the potential nutritional value of the nanoparticles themselves, especially for the essential micronutrients necessary for host defense. We also posit that these positive effects are likely a result of the greater availability of the nutrients in the "nano" form. Last, we offer comments on the current regulatory perspective for such applications.

Garvin, A.; Doucette, W. J.; **White, J.C.** 2015. Investigating differences in the root to shoot transfer and xylem sap solubility of organic compounds between zucchini, squash and soybean using a pressure chamber method. *Chemosphere* DOI:10.1016/j.chemosphere. 2014.11.075.

ABSTRACT: A pressure chamber method was used to examine differences in the root to shoot transfer and xylem sap solubility of caffeine (log Kow = −0.07), triclocarban (log Kow = 3.5–4.2) and endosulfan (log Kow = 3.8–4.8) for zucchini (cucurbita pepo ssp pepo), squash (cucurbita pepo ssp ovifera), and soybean (glycine max L.). Transpiration stream concentration factors (TSCF) for caffeine (TSCF = 0.8) were statistically equivalent for all plant species. However, for the more hydrophobic endosulfan and triclocarban, the TSCF values for zucchini (TSCF = 0.6 and 0.4, respectively) were 3 and 10 times greater than the soybean and squash (TSCF = 0.2 and 0.05, respectively). The difference in TSCF values was examined by comparing the measured solubilities of caffeine, endosulfan and triclocarban in deionized water to those in soybean and zucchini xylem saps using a modified shake flask method. The measured solubility of organic contaminants in xylem sap has not previously been reported. Caffeine solubilities in the xylem saps of soybean and zucchini were statistically equal to deionized water (21 500 mg L−1) while endosulfan and triclocarban solubilities in the zucchini xylem sap were significantly greater (0.43 and 0.21 mg L−1, respectively) than that of the soybean xylem sap (0.31 and 0.11 mg L−1, respectively) and deionized water (0.34 and 0.11 mg L−1, respectively). This suggests that the enhanced root to shoot transfer of hydrophobic organics reported for zucchini is partly due to increased solubility in the xylem sap. Further xylem sap characterization is needed to determine the mechanism of solubility enhancement.

Zhang, W.; Ebbs, S.D.; **Musante, C.**; **White, J.C.**; Gao, C.; Ma, X. 2015. Uptake and Accumulation of bulk and nano-sized cerium oxide particles and ionic cerium by radish (*Raphanus sativus L.). J. Agric. Food Chem.* 63(2):382-90

ABSTRACT: The potential toxicity and accumulation of engineered nanomaterials (ENMs) in agricultural crops has become an area of great concern and intense investigation. Interestingly, although below-ground vegetables are most likely to accumulate the highest concentrations of ENMs, little work has been done investigating the potential uptake and accumulation of ENMs for this plant group. The overall objective of this study was to evaluate how different forms of cerium (bulk cerium oxide, cerium oxide nanoparticles, and the cerium ion) affected the growth of radish (Raphanus sativus L.) and accumulation of cerium in radish tissues. Ionic cerium (Ce(3+)) had a negative effect on radish growth at 10 mg CeCl3/L, whereas bulk cerium oxide (CeO2) enhanced plant biomass at the same concentration. Treatment with 10 mg/L cerium oxide nanoparticles (CeO2 NPs) had no significant effect on radish growth. Exposure to all forms of cerium resulted in the accumulation of this element in radish tissues, including the edible storage root. However, the accumulation patterns and their effect on plant growth and physiological processes varied with the characteristics of cerium. This study provides a critical frame of reference on the effects of CeO2 NPs versus their bulk and ionic counterparts on radish growth.

Collin, B.; Auffan, M.; Johnson, A.; Kaur, I.; Keller, A.A.; Lazareva, A.; Lead, J.; Ma, X.; Merrifield, R.; Svendsen, C.; **White, J.C.**; Unrine, J.M. 2014. Environmental release, fate and ecotoxicological effects of manufactured ceria nano materials. *Environ. Sci.*: Nano. 1, 533-548.

ABSTRACT: Recent interest in the environmental fate and effects of manufactured CeO2 nanomaterials (nanoceria) has stemmed from the expanded use for a variety of applications including fuel additives, catalytic converters, chemical and mechanical planarization media and others. This has led to a wave of publications on the toxicological effects of nano in ecological receptor species, but only limited information is available on possible environmental releases, concentrations in environmental medial, or environmental transformations. In this paper, we make initial estimates of likely environmental releases and exposure concentrations in soils and water and compare them to published toxicity values. Insufficient information was available to estimate aquatic exposures, but we estimated inputs to a wastewater treatment plant that could result effluent concentrations that would result in acute toxicity to the most sensitive aquatic organisms tested so far, cyanobacteria. The purpose of this exercise is to identify which areas are lacking in data to perform either regional or site specific ecological risk assessments. While estimates can be made for releases from use as a diesel fuel additive, and the predicted acute toxicity is low, estimates for releases from other uses are difficult at this stage. We recommend that future studies focus on environmentally realistic exposures that take into account potential environmental transformations of the surface as well as chronic toxicity studies in benthic aquatic organisms, soil invertebrates and microorgansims.

Robb, C.S., 2015, The analysis of abrin in food and beverages, *Trends in Analytical Chemistry*, pp. 100-106 DOI information: 10.1016/j.trac.2015.01.003.

ABSTRACT: *Abrus precatorius* has been known since ancient times, as has the fact that the seeds contain a deadly toxin determined to be abrin. Herein is an overview of the analytical techniques and methods that have been used to determine abrin and compare abrin with the related small molecule abrine in food and beverages. There are identified areas where significant knowledge gaps remain and highlight future work to address those shortcomings. The importance of fast, accurate, portable and accessible detection methods for select agents and associated molecules is of paramount importance to many scientific communities.

Grubaugh ND, Sharma S, Krajacich BJ, Fakoli Iii LS, Bolay FK, Diclaro Ii JW, Johnson WE, Ebel GD, Foy BD, **Brackney DE***. Xenosurveillance: a novel mosquito-based approach for examining the human-pathogen landscape. PLoS Negl *Trop Dis.* 2015 Mar 16; 9(3):e0003628. doi: 10.1371/journal.pntd.0003628.

ABSTRACT: Globally, regions at the highest risk for emerging infectious diseases are often the ones with the fewest resources. As a result, implementing sustainable infectious disease surveillance systems in these regions is challenging. The cost of these programs and difficulties associated with collecting, storing and transporting relevant samples have hindered them in the regions where they are most needed. Therefore, we tested the sensitivity and feasibility of a novel surveillance technique called xenosurveillance. This approach utilizes the host feeding preferences and behaviors of Anopheles gambiae, which are highly anthropophilic and rest indoors after feeding, to sample viruses in human beings. We hypothesized that mosquito bloodmeals could be used to detect vertebrate viral pathogens within realistic field collection timeframes and clinically relevant concentrations. METHODOLOGY/PRINCIPAL FINDINGS: To validate this approach, we examined variables influencing virus detection such as the duration between mosquito blood feeding and mosquito processing, the pathogen nucleic acid stability in the mosquito gut and the pathogen load present in the host's blood at the time of bloodmeal ingestion using our laboratory model. Our findings revealed that viral nucleic acids, at clinically relevant concentrations, could be detected from engorged mosquitoes for up to 24 hours post feeding by qRT-PCR. Subsequently, we tested this approach in the field by examining blood from engorged mosquitoes from two field sites in Liberia. Using next-generation sequencing and PCR we were able to detect the genetic signatures of multiple viral pathogens including Epstein-Barr virus and canine distemper virus. CONCLU- SIGNIFICANCE: Together, these data demonstrate the feasibility of xenosurveillance and in doing so validated a simple and non-invasive surveillance tool that could be used to complement current biosurveillance efforts.

Douglas, Sharon M. 2015. Dooks needle blight (formerly Canavirgella needlecast) of white pine. *The Connecticut Agricultural Experiment Station Fact Sheet*

ABSTRACT: Since 2009, many white pine in forests, woodlots, and landscapes throughout the Northeast have shown yellow and brown discoloration of current-season needles. Although several needlecasts have been associated with this damage, Canavirgella needlecast was reported as a key component. Recently, however, the identity of *Canavirgella banfieldii* has been questioned, since there is evidence that it is really *Lophophacidium dooksii*, the fungus associated with Dooks needle blight—the two names are thought to be synonyms for the same fungal species.

Douglas, Sharon M. 2015. Excess water problems on woody ornamentals. *The Connecticut Agricultural Experiment Station Fact Sheet*

ABSTRACT: Flooding, excess water, and poorly drained soils can be serious problems for many woody ornamentals. These may result in plant decline and death as well as uprooting of trees. This fact sheet describes the cascade of physiological and physical changes that occur in woody plants under stress from excess water.

Li, Yonghao. 2015. Seiridium canker of Leyland cypress. *The Connecticut Agricultural Experiment Station Fact Sheet*

ABSTRACT: Leyland cypress is widely grown in commercial and residential landscapes. With this increase in popularity, diseases of Leyland cypress have become increasingly important, including Seiridium canker, a fungal disease. This fact sheet provides a review of symptoms, disease development, and management strategies for Seiridium canker.

Li, Yonghao. 2015. Downy mildew of impatiens. *The Connecticut Agricultural Experiment Station Fact Sheet*

ABSTRACT: Downy mildew is a highly destructive disease of garden impatiens. A widespread outbreak of the disease in 2012 resulted in considerable economic losses in North America. This fact sheet discusses symptoms, conditions for disease development and strategies for disease management.

Pignatello, JJ,* **Elmer, WH,** Biochar: Researchers Explore an Ancient Substance with Future Promise, *Connecticut Horticultural Society Newsletter*, 57(6), March, 2015.

ABSTRACT: This article appeared in Question and Answer format. It addressed the following. What is biochar? What is it made from and how? What is the history of biochar? How long has the CAES been researching biochar? Why is biochar important for your department to research? So far, do you find biochar is living up to claims made such as improving crop yields, stabilizing contaminated soil and reducing carbon emissions? Can you tell us how biochar might produce plants with fewer diseases? Is it time for gardeners to jump on the bandwagon, or is the jury still out?

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STATION NEWS

The Connecticut Agricultural Experiment Station

JOURNAL ARTICLES APPROVED MARCH 2015

Douglas, Sharon M. Excess water problems on woody ornamentals. *CAES Fact Sheet* (rev. March 2015)

Cowles, Richard S. Use of neonicotinoids in the home landscape. *CAES Fact Sheet*

Dingman, Douglas W. Testing honey bees for nosemosis: using a compound light microscope. *CAES Fact Sheet*

Dingman, Douglas W. Testing honey bees for nosemosis: microscopy and sequential sampling. *CAES Fact Sheet*

Douglas, Sharon M. Dooks needle blight (formerly Canavirgella needlecast) of white pine. *CAES Fact Sheet* (revised March 2015)

Ebbs, S., S. Bradfield, P. Kumar, **Jason C. White, Craig Musante,** and X. Ma. Accumulation of zinc, copper, or cerium in carrot *(Daucus carota)* exposed to metal oxide nanoparticles. *Environmental Science: Nano*

Elmer, Wade H., Robert E. Marra, Hui Li, and Bo Li. Incidence of *Fusarium spp.* on the invasive *Spartina alterniflora* on Chongming Island, Shanghai, China. *Biological Invasions*

Rapp, Micah, Jessica Schein, Kevin A. Hunt, Vamsi Nalam, George S. Mourad, and **Neil P. Schultes.** The solute specificity profiles of Nucleobase Cation Symporter 1 (NCS1) from *Zea mays* and *Setaria viridis* illustrate functional flexibility. *Protoplasma*

Gent, Martin P. N. Effect of daily and diurnal variation of irradiance on composition of spinach in comparison with lettuce. *HortScience*

Arango-Velez, Adriana. Soil structure and tree health in urban areas: what do we need to know? *CAES Fact Sheet*

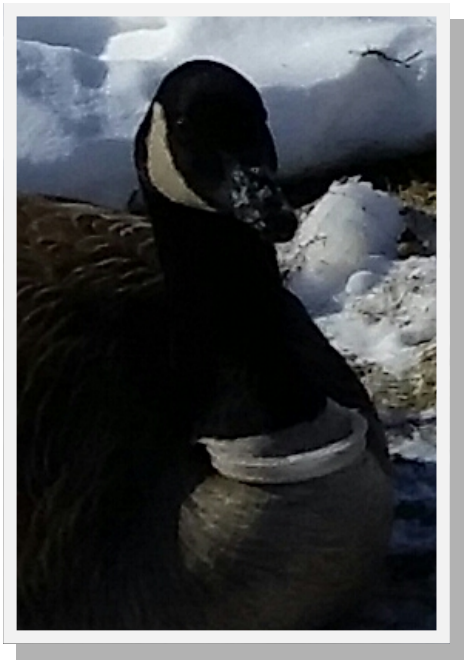
Rutledge, Claire E., M. K. Fierke, P. D. Careless, and C. Teerling. Degree day model for *Cerceris fumipennis* in Northeastern America based on field observations. *Annals of the Entomological Society of America*

Williams, Scott, and **Michael Short.** Reducing rabbit damage in Connecticut. *CAES Fact Sheet*

Ward, Jeffrey S., Volin, Worthley, and Parent. "Stormwise" roadside forest management. *CT Botanical Society Newsletter*

ARTICLES OF INTEREST

DR. TEJA SHIDORE started working as a Postdoctoral Research Associate from mid-March in the group of Dr. Lindsay Triplett at the Department of Plant Pathology and Ecology. After completing her PhD from the Department of Microbe-Plant interactions, University of Bremen, Germany, she relocated to Connecticut last year. She will work towards understanding virulence strategies of bacterial pathogens with focus on determining the role of AvrRxo1 in pathogenesis by *Xanthomonas*. She lives in New Haven with her husband Ketan and enjoys swimming, playing badminton, and travelling.



Dr. Scott Williams helped a Canada Goose that had a piece of garbage around its neck. He captured the goose and got the plastic ring off. The geese have been hanging out next to the Osborne Library.

ARTICLES OF INTEREST

DR. LUCA PAGANO of the University of Parma joined the Department of Analytical Chemistry as a Visiting Post-doctoral Fellow on Thursday March 5th. Luca received a one-year Fellowship from the University of Parma to work on a project investigating the molecular effects of nanoparticle exposure in plants.

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