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 presented an update on the Jenkins-Waggoner building, new research initiatives and new staff members at the 2015 Winter Symposium of the Connecticut Nursery and Landscape Association held at the Yale Commons in New Haven (700 attendees) (January 7); the Annual Meeting of the Connecticut Tree Protective Association held in Plantsville (700 attendees) (January 15); and the Connecticut Vegetable and Small Fruit Growers Conference held in South Windsor (100 attendees) (January 15); presided over a quarterly meeting of the Station's Board of Control held in Hartford (January 21); attended a Council Meeting of the Connecticut Academy of Science and Engineering held in Wethersfield (January 28); and with **DR. JASON WHITE** attended a meeting with Dr. Cameron Faustman, and Dr. Michael O'Neil of the University of Connecticut's College of Agriculture and Natural Resources to discuss the 2015 Plan of Work (January 29).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE attended the monthly Laboratory Preparedness Advisory Group Meeting at the CT Department of Public Health Laboratory in Rocky Hill CT (20 attendees) (January 5); 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)"(5 attendees) (January 5, 9); was asked by the American Chemical Society to chair the *Environmental Science and Technology* Best Papers of 2014 Selection Committee (January 19); participated in the Association of Public Health Laboratories (APHL) Data Acceptance Work Group teleconference call (15 attendees) (January 20); attended the New Haven County Farm Bureau "Meet and Greet" dinner and gave an update on Station activities (35 attendees) (January 20); along with **DR. CHRISTINA ROBB, DR. WALTER KROL, MS. KITTY PRAPAYOTIN-RIVEROS, MR. MICHAEL CAVADINI, MR. JOSEPH HAWTHORNE, MR. CRAIG MUSANTE, MR. JOHN RANCIATO, AND MS. TERRI ARSENAULT** participated in a bimonthly FDA ISO Accreditation Mentor-Mentee teleconference call with the Ohio Department of Agriculture (January 22); met with Dr. Minoo Alasti, a postdoctoral candidate from the University of Iowa, who was interviewing for the Louis A. Magnarelli Post-Doctoral Fellowship (January 23); along with **DR. CHRISTINA ROBB** participated in an FDA teleconference call on program updates for the FERN Chemistry Cooperative Agreement Program (cCAP)(January 28); and along with **DR. THEODORE ANDREADIS**, met with Dr. Cameron Faustman and Dr. Mike O'Neill of the University of Connecticut College of Agriculture, Health and Natural Resources to discuss our agencies joint USDA Plan of Work (January 29).

DR. BRIAN EITZER participated in the PI meeting of the NC1173 multi state hatch grant entitled "Sustainable Solutions to Problems Affecting Bee Health" (25 attendees); attended the American Bee Research Conference (100 people) in Tucson Arizona (January 22-23); and the NACRW organizing committee conference call (January 15).

ENTOMOLOGY

DR. KIRBY C. STAFFORD III attended the Connecticut Nursery and Landscape Association meeting in Manchester (January 14) and participated in the Connecticut Tree Protective Association winter meeting held at the Aqua Turf in Plantsville (January 15).

MR. MARK H. CREIGHTON was interviewed for an article on bees, beekeeping, and the health of the honeybee by Denise Coffy for Reminder News (January 9) and presented a workshop on the role that pollinators play in support of Connecticut's agriculture and provided an overview on how to set-up and maintain honey bee hives in the backyard at the Middletown Agricultural Science & Technology Program's Continuing Education Winter Conference held at Middletown High School (22 attendees) (January 10).

MS. KATHERINE D. DUGAS staffed a CAPS and Forest Pest booth at the CT Nursery and Landscape Association Winter Meeting in New Haven (January 7 and 8); staffed a CAPS and Forest Pest booth at the CT Tree Protective Association Winter Meeting held at the Aqua Turf in Plantsville (January 15); and staffed a Forest Pest/ Don't Move Firewood Table at the Northeast RV and Camping Show at the Hartford Convention Center (300+ people visited the booth during the weekend) (January 23 and 25).

DR. CLAIRE E. RUTLEDGE attended the Connecticut Tree Protective Association Winter Meeting where she was honored to be nominated for and elected to the Governing Board of the Connecticut Tree Protective Association (January 15).

DR. VICTORIA L. SMITH presented a talk titled "Emerald Ash Borer - Boxwood Blight** plus a new one" at the CT Nursery and Landscape Association Winter Meeting held at Yale Commons in New Haven (approx. 80 participants) (January 7).

DR. KIMBERLY A. STONER gave a talk titled "Saving our Bees" to members of the Danbury Garden Club (35 attendees) (January 16).

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO attended a grantees workshop Heavy Hydrocarbon Scientific Research Group, at the Chevron Inc. corporate headquarters in San Ramon, California (approximately 100 attendees) (January 22-23).

DR. PHILIP ARMSTRONG gave an invited lecture, “An Overview and Survey of Arboviral Diseases” for the Biology of Disease Vectors course held at the Yale School of Public Health (approximately 20 attendees) (January 21).

DR. GOUDARZ MOLAEI gave an invited lecture, “Eco-epidemiology of Old World Malaria” for the Biology of Insect Disease Vectors course at the Yale School of Public Health (approximately 20 attendees) (January 28).

MR. JOHN SHEPARD attended a meeting of the Board of Directors of the Northeastern Mosquito Control Association in Northboro, MA (7 attendees) (January 23).

MR. GREGORY BUGBEE presented a talk entitled “Control of curlyleaf pondweed with diquat and protection of listed species with limnobarriers” at the 2015 Northeast Aquatic Plant Management Society Conference In Saratoga Springs, NY (approx. 100 attendees) (January 21); with Jennifer Fanzutti administered the Northeastern State Aquatic Supervisory License Recertification Program at the 2015 Northeast Aquatic Plant Management Society Conference In Saratoga Springs, NY (approx. 100 participants) (January 22); and participated on a panel of lake experts to receive public input and on a watershed management plan at a special meeting of the Lake Hayward Association in East Haddam, CT (approx. 60 attendees) (January 31).

FORESTRY AND HORTICULTURE

DR. JEFFREY WARD along with **DR. ADRIANA ARANGO-VELEZ** spoke on "Poda de árboles y arbustos" at the Seminarios en Español of the CNLA Annual Meeting in New Haven (32 attendees) (January 8); and spoke on "A short history of Connecticut's forests" at the Connecticut Tree Protective Association's 93rd Annual Meeting in Plantsville (400 attendees) (January 15).

DR. ADRIANA ARANGO-VELEZ presented “Being a good tree steward” at the Leete's Island Garden Club in Guilford (30 attendees) (January 12); and attended the 93rd Annual Meeting of the Connecticut Tree Protective Association at the Aquaturf in Southington (January 15).

DR. ABIGAIL MAYNARD reported on CAES activities at a meeting of the State Technical Committee in Tolland (21 attendees) (January 14); displayed information about the New Crops Program at the Connecticut Vegetable and Small Fruit Growers meeting (300 attendees) (January 15); and participated in quarterly meeting of the Council on Soil and Water Conservation (January 22).

DR. SCOTT WILLIAMS gave an invited lecture titled “Ticked Off! Invasive Plants, Ticks, Deer and Lyme Disease—A Surprising Connection” hosted by the Cherry Brook Garden Club, Canton (60 attendees) (January 13); participated in a conference call meeting of the Executive Board of the Northeast Section of The Wildlife Society (January 29); and participated in a conference call meeting of the Executive Board of the Connecticut Urban Forest Council (January 29).

MR. J.P. BARSKY attended the 93rd Annual Meeting of the Connecticut Tree Protective Association at the Aquaturf in Southington (January 15).

PLANT PATHOLOGY AND ECOLOGY

DR. SHARON M. DOUGLAS attended the CNLA Winter Symposium held at Yale University (January 7); and participated in and organized the CTPA Annual Meeting and coordinated the CAES booth at the Aqua Turf in Plantsville (760 adult attendees) (January 15).

DR. WADE H. ELMER presented a talk titled "Latest strategies in Management of root rot of perennials" at the CT Nursery and Landscape Winter Meeting in New Haven (33 attendees) (January 8); was visited by Lorie Staver, a PhD graduate student from the University of Maryland, and discussed salt marsh wetland projects (January 12); and attended the Small Fruit and Vegetable meeting in South Windsor (January 15).

DR. YONGHAO LI staffed the Station booth and answered questions about tree diseases at the CTPA Winter Meeting held at Aqua Turf in Plantsville (760 adult attendees) (January 15).

DR. ROBERT E. MARRA presented a talk titled "Tropical Storms, Hurricanes, and Superstorms: Impacts and Influences on Tree Diseases" to the North Haven Garden Club (45 attendees) (January 8).

MS. LINDSAY A. PATRICK staffed the Station booth and answered questions about tree diseases at the CTPA Winter Meeting held at Aqua Turf in Plantsville (760 adult attendees) (January 15); and attended the NPDN STAR-D Quality Management Systems Training workshop in Ames, IA (January 27-30).

DR. NEIL P. SCHULTES attended an executive board meeting for the Quinnipiac Chapter of Sigma Xi (January 22) and presented a lecture on "Genetically Modified Plants" to a Yale University Freshman Science Seminar class Scie031 (12 students) (January 23 and 30).

DR. LINDSAY R. TRIPLETT attended the Connecticut Nursery and Landscape Winter Symposium held at the Yale Commons (January 7).

DR. QUAN ZENG attended the CNLA Winter Symposium held at Yale University (January 7); attended the CTPA Annual Meeting held at Aqua Turf in Plantsville (January 15); and attended the New England Regional Turfgrass Conference in Providence, RI (January 28).

DEPARTMENTAL RESEARCH UPDATES

Brackney DE, Schirtzinger EE, Harrison TD, Ebel GD, Hanley KA. Modulation of Flavivirus Population Diversity by RNA Interference, *Journal of Virology*, January 28, 2015; pii: JVI.02612-14. [Epub ahead of print] This article was selected by the editors of the Journal of Virology to be one of its Spotlight articles for the printed/ online version of Volume 89 Issue 7.

ABSTRACT: To test the hypothesis that RNAi imposes diversifying selection on RNA virus genomes, we quantified West Nile virus (WNV) quasispecies diversity after passage in Drosophila cells in which RNAi was left intact, depleted, or stimulated against WNV. As predicted, WNV diversity was significantly lower in RNAi-depleted cells and significantly greater in RNAi-stimulated cells relative to controls. These findings reveal that an innate immune defense can shape viral population structure.

Xiao F and **Pignatello JJ**.* π^+–π Interactions between (Hetero)aromatic Amine Cations and the Graphitic Surfaces of Pyrogenic Carbonaceous Materials, *Environmental Science & Technology*, **2015**, *49* (2), pp 906–914 **Publication Date (Web):** January 8, 2015; **DOI:** 10.1021/es5043029.

ABSTRACT: Many organic compounds of environmental concern contain amine groups that are positively charged at environmental pH. Here we present evidence that (hetero) aromatic amine cations can act as π acceptors in forming π^+–π electron donor–acceptor (EDA) interactions with the π electron-rich, polyaromatic surface of pyrogenic carbonaceous materials (PCMs) (i.e., biochar, black carbon, and graphene). The π^+–π EDA interactions combine a cation−π force with a π–π EDA force resulting from charge polarization of the ring's quadrupole. Adsorption on a biochar and reference adsorbent graphite was conducted of triazine herbicides, substituted anilines, heterocyclic aromatic amines, and other amines whose charge is insulated from the aromatic ring. When normalized for the hydrophobic effect, the adsorption increased with decreasing pH as the amines became ionized, even on graphite that had no significant fixed or variable charge. The cationic π acceptor (quinolinium ion) was competitively displaced more effectively by the π acceptor 2,4-dinitrobenzene than by the π donor naphthalene. The maximum electrostatic potential of organocations computed with density functional theory was found to be a strong predictor of the π^+–π EDA interaction. The π^+–π EDA interaction was disfavored by electropositive alkyl substituents and by charge delocalization into additional rings. Amines whose charge was insulated from the ring fell far out of the correlation (more positive free energy of adsorption). Identifying and characterizing this novel π^+–π EDA interaction on PCMs will help in predicting the fate of organocations in both natural and engineered systems.

Li X, Gámiz B, Wang Y, **Pignatello JJ**,* and Xing B. Competitive Sorption Used To Probe Strong Hydrogen Bonding Sites for Weak Organic Acids on Carbon Nanotubes, *Environmental Science & Technology*, 2015, *49* (3), pp 1409–1417; Publication Date (Web): January 6, 2015; DOI: 10.1021/es504019u.

ABSTRACT: We recently proposed that weak acids (AH) adsorb to partially oxidized carbonaceous materials in part by forming strong hydrogen bonds with acidic surface groups, depicted by $(A\cdots H\cdots O\text{–surf})^-$, known as negative charge-assisted hydrogen bonds, (−)CAHBs. Here we use competition experiments to show that sorption of AH on carbon nanotubes (CNTs) can be described conceptually by a dual specific/nonspecific domain model, where one domain involves (−)CAHB sites that can become saturated. The trends observed in single-solute adsorption, including the stoichiometric release of hydroxide upon sorption of carboxyate or phenolate anions, were consistent with trends in the previous studies and pointed to the formation of (−)CAHB. 3,4-Dinitrophenolate formed (−)CAHBs more efficiently than did 2,6-dichloro-4-nitrophenolate because of alleviation of steric hindrance to approach by the ortho chlorines. Competition against a (−)CAHB-capable target compound was greater when the competitor was also (−)CAHB-capable than when it was not (e.g., benzoate as target vs 3,4-dinitrophenolate or nitrobenzene as competitor; mono-*n*-butyl phthalate as target vs methyl benzoate or *p*-tolyl acetate as competitor). Experiments also revealed competition between the nitroaromatic species for π–π electron donor–acceptor sites. The findings will contribute to a better understanding of the adsorption mechanism of ionizable compounds on carbonaceous materials.

Yang B, **Pignatello JJ**,* Qu D, and Xing B. Reoxidation of Photoreduced Polyoxotungstate ($[PW_{12}O_{40}]^{4-}$) by Different Oxidants in the Presence of a Model Pollutant. Kinetics and Reaction Mechanism, *Journal of Physical Chemistry A*, Articles ASAP (As Soon As Publishable); Publication Date (Web): January 28, 2015; DOI: 10.1021/jp510036x.

ABSTRACT: Polyoxometalates (POMs) are attractive photocatalysts for water purification. Reoxidation of the photoreduced form of POM by a bulk oxidant is an important step in the cycle yet has received little attention. Photoreduced phosphotungstate ($[PW_{12}O_{40}]^{4-}$; "POM^{-}") was reacted with bulk oxidants, XOOX, including hydrogen peroxide (HP), peroxyacetic acid (PAA), peroxymonosulfate (MS), peroxydisulfate (DS), and dioxygen (O_2), in the presence of the model pollutant 2-propanol under various conditions, and the stoichiometries and rate laws were established. A unified chain reaction is proposed in which the rate-limiting step is outer-sphere one-electron transfer to XOOX yielding $^{\bullet}OX$ ($^{\bullet}OH$, $SO_4^{\bullet-}$ or $CH_3CO_2^{\bullet}$). This step is found to be proton-assisted when the leaving group OX^- is a strong base (OH^-), but independent of $[H^+]$ when the leaving group is a weak base ($O_2^{\bullet-}$, SO_4^{2-}). The rate of this step follows the order PAA > MS > O_2 > HP > DS at pH 1.3, but O_2 > PAA > MS > HP > DS at pH 4.1. The chain includes a number of POM^--regenerating steps that, with some bulk oxidants (especially MS and DS), leads to further consumption of bulk oxidant and transformation of pollutant. These steps were identified through effects of conditions on reaction stoichiometry, order with respect to $[POM^-]$, and suppression by POM. Chloride ion "short-circuits" the chain by reducing $^{\bullet}OX$ and forming $Cl_2^{\bullet-}$, which scavenges POM^-. The results provide insight into POM-catalyzed redox reactions in water purification and selective redox applications.

Hayes, Laura E., Jennifer A. Scott, and **Kirby C. Stafford III.** 2015. Influences of weather on *Ixodes scapularis* nymphal densities at long-term study sites in Connecticut. *Ticks & Tick-Borne Diseases.* (In press) http://dx.doi.org/10.1016/j.ttbdis.2015.01.006.

ABSTRACT: Tick species worldwide are implicated in transmission of pathogens that cause mild to severe diseases in humans and livestock. Although tick population densities are often highly correlated with tick-borne disease rates, we currently know little about which factors underlie annual changes in those tick population densities. We used a 25-year dataset of *Ixodes scapularis* drag-sampling surveys at two locations in Connecticut, USA, to investigate the relationship between average nymphal density from mid-May to mid-August and monthly, lagged regional weather variables. The dataset was randomly split into two data subsets, one for hypothesis development and one for hypothesis testing. Nymphal density showed the strongest association with the Standardized Precipitation Index for January of the same year that density data were collected in the analysis based on the hypothesis development data subset. This association was positive; nymphal tick density increased with regional winter precipitation. Nymphal density was positively associated with this same weather variable in the hypothesis testing data subset. Weather conditions during the coldest months of the year may serve as a bottleneck to tick populations, thereby functioning as an important correlate of not only annual blacklegged tick nymphal densities the following summer, but also entomological risk associated with tick-borne pathogens transmitted by this species.

Ward, J.S. 2015. Improving competitive status of oak regeneration using stand management and prescribed fires. *Journal of Sustainable Forestry.* 34: 105-124.

ABSTRACT: The effect of prescribed fire characteristics and timber harvest treatments on top-kill and resprouting in northeastern deciduous hardwood forests was compared among species groups (oak, maple, birch) and size classes to determine if the competitive status of oak regeneration could be enhanced. Prescribed fires were completed in three distinct stand structures (treatments): recent shelterwoods, recent clear-cuts, and stands with significant mountain laurel understories. In each burn, fire behavior was monitored on three to eight plots (15 m × 15 m) using thermocouples arrays. All stems ≥ 140 cm tall within each plot or ≥ 6 cm dbh within 15 m of plot centers were examined for girdling and the number and height of new sprouts during the second growing season after the fire. Top-kill did not vary among species groups and could be described by a logistic function that included treatment, initial stem size, and maximum temperature. Apparent top-kill increased with thermocouple maximum temperature, decreased with stem size, and increased from shelterwood to clear-cut to mountain laurel understory burns. Proportion of top-killed stems with new sprouts was greatest for mountain laurel and oak. A combination of stand manipulation and prescribed fire can improve the competitive status of oak seedlings by modifying regeneration composition and height distribution.

Elmer, W. H. 2014. Management of Fusarium diseases on asparagus. *Crop Protection* http://dx.doi:10.1016/j.cropro.2014.12.005.

ABSTRACT: Fusarium crown and root rot of asparagus occurs wherever asparagus is grown. The pathogens *Fusarium oxysporum* f. sp. *asparagi*, *F. proliferatum*, F. *redolens*, and *F. solani* are ubiquitous in soil and on seeds. The review is structured to focus on recent management strategies that affect the three components of the disease triangle: pathogen, host, and environment. An analysis of each strategy is discussed in regard to knowledge gaps and future direction.

Gullino, M. L., M. L. Daughtrey, A. Garbaldi, and **W. H. Elmer.** 2015. *Fusarium* wilt of ornamental and their management. *Crop Protection* http://dx.doi.org/10.1016/j.cropro.2015.01.003.

ABSTRACT: The production of ornamental plants continues to be a thriving and expanding industry in the United States, Canada, South America, Australia, and Europe, supported by plant industries in any developing countries. Fusarium wilt diseases, however, continue to plague the industry due to imperfections in clean stock propagation systems, latency of disease development, irrigation systems that allow propagule spread, and a low priority placed on breeding efforts towards Fusarium-resistant cultivars of ornamentals. Management requires a multifaceted approach employing cultivar resistance as well as cultural, biological, and chemical strategies. Ignorance of the sources of inoculum and how it is spread has allowed many missed opportunities for preventing Fusarium wilt diseases. When the disease has become established in a production system, many approaches for achieving suppression have been explored, but most have not met the high standard for a zero disease threshold demanded by the industry. The following review was designed to highlight management studies that have advanced our knowledge of how to minimize Fusarium diseases and to indicate areas where additional research and technological development are needed.

L. R. Triplett, V. Verdier, T. Campillo, C. Van Malderghem, I. Cleenwerk, M. Maes, L. Deblais, R. Corral, O. Koita, B. Cottyn, and J. Leach. 2015. Characterization of a novel clade of *Xanthomonas* isolated from rice leaves in Mali and proposal of *Xanthomonas maliensis* sp. nov. *Antonie van Leeuwenhoek*, DOI 10.1007/s10482-015-0379-5.

ABSTRACT: Four bacterial strains, designated M89, M92, M97T, and M106, were isolated in a previous study from surface-sterilized leaves of rice (*Oryza sativa*) or *murainagrass* (*Ischaemum rugosum*) at three sites in Mali, Africa. Here they were examined by a polyphasic taxonomic approach and analysis of a whole-genome sequence. Phylogenetic analyses based on 16S rRNA sequence and multilocus sequence analysis of seven genes showed that these four strains formed a distinct lineage representing a novel species within the genus *Xanthomonas*. This was supported by whole-genome average nucleotide identity values calculated from comparisons of strain M97T with established *Xanthomonas* species. The strains can be differentiated from the known *Xanthomonas* species on the basis of their fatty acid and carbohydrate utilization profiles. Population growth studies on rice confirmed that these bacteria multiply in rice leaves without causing symptoms. Identification of this novel species can be accomplished by using diagnostic primer sets or by gyrB gene sequence analysis. We propose to classify these rice- and grass-associated bacteria as *Xanthomonas maliensis* sp. nov. with strain M97T = CFBP7942T = LMG27592T as the type strain.

S. Aćimović, **Q. Zeng,** G. McGhee, G. Sundin, and J. Wise. 2015. Control of fire blight (*Erwinia amylovora*) on apple trees with trunk-injected plant resistance inducers and antibiotics and assessment of induction of pathogenesis-related protein genes. *Frontiers in Plant Science* http://journal.frontiersin.org/Journal/10.3389/fpls.2015.00016/abstract.

ABSTRACT: Management of fire blight is complicated by limitations on use of antibiotics in agriculture, antibiotic resistance development, and limited efficacy of alternative control agents. Even though successful in control, preventive antibiotic sprays also affect non-target bacteria, aiding the selection for resistance which could ultimately be transferred to the pathogen *Erwinia amylovora*. Trunk injection is a target-precise pesticide delivery method that utilizes tree xylem to distribute injected compounds. Trunk injection could decrease antibiotic usage in the open environment and increase the effectiveness of compounds in fire blight control. In field experiments, after 1–2 apple tree injections of either streptomycin, potassium phosphites (PH), or acibenzolar-*S*-methyl (ASM), significant reduction of blossom and shoot blight symptoms was observed compared to water injected control trees. Overall disease suppression with streptomycin was lower than typically observed following spray applications to flowers. Trunk injection of oxytetracycline resulted in excellent control of shoot blight severity, suggesting that injection is a superior delivery method for this antibiotic. Injection of both ASM and PH resulted in the significant induction of PR-1, PR-2, and PR-8 protein genes in apple leaves indicating induction of systemic acquired resistance (SAR) under field conditions. The time separating SAR induction and fire blight symptom suppression indicated that various defensive compounds within the SAR response were synthesized and accumulated in the canopy. ASM and PH suppressed fire blight even after cessation of induced gene expression. With the development of injectable formulations and optimization of doses and injection schedules, the injection of protective compounds could serve as an effective option for fire blight control.

Zeng, Q. 2014. Winter and early-season fire blight management. Handout from 2014 CT Pomological Society Annual Meeting was adapted for the *UMASS Fruit Advisor* website: http://extension.umass.edu/fruitadvisor/news/winter-and-early-season-fire-blight-management.

ABSTRACT: Fire blight caused dramatic damage to New England apple and pear orchards in 2014. Appropriate winter management is a key factor of reducing bacterial inoculum and disease pressure for the next growing season.

JOURNAL ARTICLES APPROVED JANUARY 2015

Cooley, J. R., C. Simon, **Chris T. Maier,** et al. The distribution of periodical cicada (*Magicidada: Hemiptera*: Cicadidae) brood II in 2013: disjunct emergences suggest complex brood origins. *American Entomologist*

Elmer, Wade H. Pathogenic fungi associated with *Spartina* in salt marshes. Book Chapter, *Biology of the Microfungi*, De-Wei Li (Editor)

Maynard, Abigail A. Performance of 13 specialty pumpkin cultivars over three years in Connecticut. *HortTechnology*

Servin, Alia, Wade Elmer, A. Mukherjee, Roberto de la Torre Roche, M. Hamdi, **Jason C. White,** and C. Dimkpa. A review of the use of engineered nanomaterials to suppress plant disease and enhance yield. *Journal of Nanoparticle Research*

Triplett, Lindsay R., V. Verdier, T. Campillo, C. Van Malderghem, I. Cleenwerck, M. Maes, L. Deblais, R. Corral, O. Koita, B. Cottyn, and J. E. Leach. Characterization of a novel clade of *Xanthomonas* isolated from rice leaves in Mali and proposal of *Xanthomonas maliensis* sp. nov. *Antonie van Leeuwenhoek*

Xiao, Feng, and **Joseph J. Pignatello.** Interactions of triazine herbicides with pyrogenic carbonaceous materials: steric and electronic effects. *Water Research*

Aćimović, S. G., **Quan Zeng,** G. C. McGhee, G. W. Sundin, and J. C. Wise. Control of fire blight (*Erwinia amylovora*) on apple trees with trunk-injected plant resistance inducers and antibiotics and assessment of induction of pathogenesis-related protein genes. *Frontiers in Plant Science*

GRANTS RECEIVED JANUARY 2015

Dr. Joseph J. Pignatello received a grant of $24,161.31 from Chevron Inc. as a subcontract of the University of California at Davis for the project entitled, Biochar Amendment: A Sustainable Remediation Strategy for Shallow Soil Contamination by Heavy Hydrocarbons for the period 4-22-14 to 2-15-2015.

Dr. Quan Zeng's proposal titled "Monitor and prevent streptomycin resistance in *Erwinia amylovora* populations in New England" was funded by USDA Northeastern IPM Partnership Grants ($49,988).

In this project, Dr. Zeng will collaborate with Dr. Dan Cooley from the University of Massachusetts to conduct a survey of the streptomycin resistance in fire blight bacterial population in the New England region.

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

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Lockwood Farm, Hamden

Griswold Research Center, Griswold

Valley Laboratory, Windsor

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION

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Station News was prepared and edited by Dr. Theodore G. Andreadis, and Mrs. Vickie Bomba-Lewandoski.