## ECOLOGY AND EVOLUTIONARY BIOLOGY

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### AQUATIC PLANTS CLASS FINDS "HIGHLY INVASIVE" PLANT IN COVENTRY LAKE

On a recent field trip to Coventry Lake, Don Les and his students in EEB3204/5204 (Aquatic Plants) found a "very highly invasive aquatic plant" according to the Department of Energy and Environmental Protection.

DEEP noted six fragments of the Hydrilla verticillata have been found and identified in Coventry Lake.

"This is a troubling discovery," said William Hyatt, DEEP's chief of natural resources. "This plant is highly invasive, and to date has only been found in a few locations in Connecticut. Finding it in a public water body



Photo credit: Gerry Broome/AP

that supports recreational use is concerning."

The hydrilla plant is not native to the United States but was likely introduced into southeastern states in the 1950s and is beginning to appear in northeastern states, DEEP said. DEEP said it is unclear how the plant came to be found in the lake and that there are only a few bodies of water in Connecticut where hydrilla has been reported.

"It spreads aggressively, forms dense mats of vegetation, easily outcompetes and displaces native plants, altering aquatic habitats, interferes with recreational activities and is very difficult to control once established," DEEP said of the plant in a statement announcing its finding.

DEEP said it will "move quickly to determine the extent of the infestation and to prevent further spread," including a survey of the lake to determine the extent of the infestation and the presence of additional staff at the boat launch to inspect boats and trailers. DEEP also encouraged boaters to follow the clean, drain, and dry precautions it outlines on its website to prevent the spread of invasive plants and animals into Connecticut's waterways

> Adapted from an article By David Moran, Hartford Courant September 25, 2015

### EEB GRADUATE STUDENT'S STUDY SUGGESTS CLIMATE CHANGE MAY ALTER TIMING OF NEW ENGLAND AUTUMN FOLIAGE

Climate change could substantially alter the timing of the autumn season in New England over the next century. These findings are important not just for scientists, but also for the multi-billion-dollar autumn foliage tourism industry.

Researchers at the University of Connecticut have projected shifts in the yearly onset of autumn, taking into account not just changing temperatures but extreme factors such as drought, frost, and other stresses. They show that while northern New England could experience later leaf changes, coastal southern New England could see a shift toward an earlier autumn season.

"Many other studies have shown that autumn could come later each year based on rising temperatures," says lead author Yingying Xie, a Ph.D. student working with Dr. John Silander. "But this is the first study to show the interactions of a range of different climate variables on regional ecosystems."

Xie's work with coauthors John Silander, and Xiaojing Wang, assistant professor of statistics, is published this week in the *Proceedings of the National A cademy of Sciences*.

Phenology, or the seasonal timing of life events in plants and animals, has been studied extensively in the spring season, says Xie, because the emergence of leaves and flower buds is easy to measure and analyze. The autumn season, however, is much more fluid: scientists don't have a consistent protocol for measuring leaf color change, and the changes happen more slowly.

Xie and her colleagues used remotely-sensed satellite data from New England forests in the years 2001 to 2012. They analyzed a region extending from northeastern Vermont and northwestern New Hampshire, to central Massachusetts and eastern Connecticut, and looked at the timing of leaf color change and drop, which signal the onset of plant dormancy.

The observed data showed that although moderate heat and drought conditions could lead to later dormancy, cold, frost, extreme wet conditions, and high heat stress could lead to earlier dormancy.

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### FALL FOLIAGE TIMING CHANGES CON'T

Using a mathematical model, the authors then made predictions for the years 2041 to 2050 and 2090 to 2099, based on climate change projections. The model suggested that future years could see later dormancy in northern New England and earlier dormancy in coastal and southern New England.

These geographic differences have to do with both the climate and the ecology of those areas, says Silander. The northern areas of Vermont and New Hampshire are mostly maples and birches, while there are more oaks in the south, in Massachusetts and Connecticut.



UConn File Photo

Oaks are more drought-tolerant, which may explain why southern New England shows less phenological sensitivity to drought variation than, say, regions dominated by maples or birches," She says. "Species composition makes a difference."

Xie says that the results could have an impact on the global carbon cycle, which is intricately connected

to climate change. Forests are a great source of carbon sequestration: they sponge up carbon dioxide out of the atmosphere, reducing the greenhouse effect. But if autumn starts coming earlier in some places, the growing season will be shortened, which would give forests less time each year to suck up carbon.

"If more carbon dioxide remains in the atmosphere, it could create a negative feedback loop that accelerates climate change," says Xie.

The researchers hope their results encourage scientists to take more variables into account when examining autumn phenology. The group is developing a project that will begin measuring leaf color variation, an obvious and key factor in measuring autumn dormancy, they say.

Xie hopes the work will also help to create more specialized predictions of autumn phenology at a smaller scale. This year, for example, in Storrs, she has noticed delays in leaf color timing for some species, and advances in others.

Adapted from UCONN TODAY Article by Christine Buckley October 20, 2015 ECOLOGY AND EVOLUTIONARY BIOLOGY Fall 2015 newsletter number 25



# **PUBLICATIONS**

Ito, H., S. Kakishima, T. Uehara, ... and **John Cooley**. 2015. Evolution of periodicity in periodical cicadas. *Scientific Reports* 5: 14094. 10.1038/srep14094 http://www.nature.com/articles/srep14094#supplementary-information

**Rangel**, **T. F.**, **R. K. Colwell**, G. R. Graves, **K. Fučíková**, C. Rahbek, and J. A. F. Diniz Filho. 2015. Phylogenetic uncertainty revisited: Implications for ecological analyses. *Evolution* 69:1301-1312.

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Ganias, K., J. N. Divino, K. E. Gherard, J. P. Davis, F. Mouchlianitis, and E. T. Schultz. 2015. A reappraisal of reproduction in Anadromous Alewives: determinate vs indeterminate fecundity, batch size and batch number. *Transactions of the American Fisheries Society* 144. DOI: 10.1080/00028487.2015.1073620

Prates, M. O., D. K. Dey, **M. R. Willig**, and J. Yan. 2015. Transformed Gaussian Markov random fields and spatial modeling of species abundance. *Spatial Statistics*. In Press.

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**Xie, Y., X. Wang,** and **J.A. Silander, Jr.** 2015. Autumn phenology: Deciduous for est responses to temperature, precipitation, and drought imply complex climate change impacts. *Proceedings of the National Academy of Science*. see also: <u>http://wnpr.org/post/summer-foliage-connecticut-s-future</u>

Visser, M.D., S.M. McMahon, C. Merow, P.M. Dixon, S. Record, E. Jongejans. Speeding up ecological and evolutionary computations in R. 2015. *PLoS Computational Biology* 11: e1004140.

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Crawford, D. J., **G.J. Anderson**, L. B. Silva, M Menezes de Sequeira, M. Moura, A. Santos-Guerra, J.K. Kelly *Journal of Botany*. 101(4): 624-636. Includes cover photo.

Anderson, Gregory J., Gabriel Bernardello and Arnoldo Santos. 2014. Reproductive Biology of *Solanum vespertilio* (Solanaceae), A Zygomorphic, Heterantherous, Enantiostylous and Andromonoecious Rare Canary Islands Endemic. *Plant Systematics and Evolution*: 301: 1191-1206. DOI: 10.1007/s00606-014-1143-4.

Crawford, D. J., **G.J. Anderson**, L. B. Silva, M Menezes de Sequeira, M. Moura, A. Santos-Guerra, J.K. Kelly and and M. E. Mort. 2015. Breeding systems in *Tolpis* (Asteraceae) in the Macaronesian islands: the Azores, Madeira and the Canaries. *Plant Systematics and Evolution:* 301:1191-1206. DOI 10.1007

F.J. Herraiz, S. Vilanova, M. Plazas, P. Gramazio, I. Andújar, A. Rodríguez-Burruezo, A. Fita, **G.J. Anderson**, J. Prohens. 2015. Phenological growth stages of pepino (*Solanum muricatum*) according to the BBCH scale. *Scientia Horticulturae* 183: 1-7.

Anderson, G. J., Mona K. J. Anderson, and Nikisha Patel. 2015. The ecology, evolution and biogeography of dioecy in the genus *Solanum*: With paradigms from the strong dioecy in *Solanum polygamum* to the unsuspected and cryptic dioecy in *Solanum conocarpum*. *American Journal of Botany*. 102 (3): 471-486.

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Metcalf, C.J.E., S.P. Ellner, D.Z. Childs, R. Salguero-Gomez, C. Merow, S.M. McMahon, E. Jongejans, M. Rees. Modeling annual variation for stochastic population dynamics using Integral Projection Models. 2015. *Methods in Ecology and Evolution*. DOI: 10.1111/2041-210X.12405.

**Neupane**, **Suman** co-authored a paper entitled "Evolution of endemism on a young tropical mountain" in *Nature* (August 2015). <u>http://www.nature.com/nature/journal/vaop/ncurrent/full/nature14949.html</u>

**Burgio, Kevin, Bueno, Veronica, and Carlson, Colin.** Paradigms for parasite conservation in *Conservation Biology*. <u>http://onlinelibrary.wiley.com/doi/10.1111/cobi.12634/epdf</u>

Natalia Norden, Hector A. Angarita, Frans Bongers, Miguel Martinez-Ramos, Inigo Granzow-de la Cerda, Michiel van Breugel, Edwin Lebrija-Trejos, Jorge A. Meave, John Vandemeer, G. Bruce Williamson, Bryan Finegan, Rita Mesquita and **Robin L. Chazdon.** Successional dynamics in Neotropical forests are as uncertain as they are predictable *PNAS* 10.1073/pnas.1500403112; <u>http://</u>www.pnas.org/content/early/2015/06/12/1500403112.abstract

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# **PUBLICATIONS**

**Wilson, Adam M.** and **Likens, Gene E.**. Content Volatility of Scientific Topics in Wikipedia: A Cautionary Tale. DOI: 10.1371/journal.pone.0134454 <u>http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0134454</u>

Jeremy T. Kerr, Alana Pindar, Paul Galpern, Laurence Packer, Simon G. Potts, Stuart M. Roberts, Pierre Rasmont, Soliver Schweiger, Sheila R. Colla, Leif L. Richardson, **David L. Wagner**, Lawrence F. Gall, **Derek S. Sikes**, Alberto Pantoja. Climate Change impacts on bumblebees converge across continents *Science* Vol.349 no 6244 pp 177-180; DOI: 10.1126/science.aaa7031 <u>http://www.sciencemag.org/</u> content/349/6244/177.full

Les, Don commentary: Water from the rock: Ancient aquatic angiosperms flow from the fossil record *PNAS* September 2015 Vol. 112 no. 35 pp. 10825-10826 <u>http://www.pnas.org/content/</u> early/2015/08/18/1514280112.full.pdf

Chazdon, Robin L., focus piece, Forest Health Second Act, *Science*, August 2015, Vol 349 no 6250 pp.810-813; DOI: 10.1126/science3496250.810 <u>http://www.sciencemag.org/content/349/6250/810.full</u>

**Jonathan P. Velotta**, Stephen D. McCormick and **Eric Schultz** *Evolution*, Vol. 69 Issue 10, pp 2676-2688; DOI: 10.1111/evo.12774 Trade-offs in osmoregulation and parallel shifts in molecular function follow ecological transitions to freshwater in the Alewife. <u>http://onlinelibrary.wiley.com/doi/10.1111/evo.12774/abstract</u>

Alejandro Rico-Guevara, Tao-Hsi Fan, Margaret Rubega *The Royal Society Proceedings B*, August 2015 Vol. 282 Issue: 1813 <u>http://dx.doi.org/10.1098/rspb.2015.1014</u>

**Jessie Rack**, published multiple articles on NPR's page during her AAAS Fellowship this summer. Those articles can be found at: <u>http://www.npr.org/templates/search/index.php?</u> <u>searchinput=jessie+rack&tabId=all&dateId=&sort=match&sort=match&start=0</u>

Janelle M. Sagawa, Lauren E. Stanley, Amy M. LaFountain, Harry A. Frank, Chang Liu, **Yao-Wu Yuan** *New Phytologist* DOI: 10.1111/nph.13647 An R2R3-MYB transcription factor regulates carotenoid pigmentation in *Mimulus lewisii* flowers

Wu, J.X., R.B. Siegel, H.L. Loffland, **Morgan W. Tingley**, et al. In press. Diversity of Great Gray Owl nest sites and nesting habitats in California. *Journal of Wildlife Management*. In Press

Rowe, K.C., K.M.C. Rowe, **Morgan W. Tingley**, et al. 2015. Spatially heterogenous impact of climate change on small mammals of montane California. *Proceedings of the Royal Society B*, 282: 20141857<u>http://classic.rspb.royalsocietypublishing.org/content/282/1799/20141857.short</u>

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**Veronica Bueno** received the Outstanding Student Paper Award at the annual meeting of the New England Association of Parasitologists which was held at Tufts University on November 7, 2015.

**Johana Goyes** was awarded 2nd place for the Best Oral Presentation at the XXV International Bioacoustics Congress in Germany in September 2015

**Kerry Mocko** was awarded the LiCor Prize for the best student presentation in plant physiology at the July 2015 Annual Meeting of the Botanical Society of America.

**Kate Nazario** was awarded the Ernst Mayr Travel Grant from the Museum of Comparative Zoology at Harvard University. Kate will use this award to travel to Argentina to study at La Plata Museum in Buenos Aires.

**Jessie Rack** was awarded a prestigious 2015 AAAS Mass Media Science and Engineering Fellowship. This 10-week summer program places science, engineering, and mathematics students at media organizations nationwide. Fellows use their academic training as they research, write, and report today's headlines, sharpening their abilities to communicate complex scientific issues to the public Jessie's assignment was with National Public Radio.

**Nik Schultz** was awarded the Ralph Lewin Award at the Phycologial Society of America 2015 Annual Meeting held in August for his poster on testing heterotropic grown in green algae associate with spotted salamander eggs.

**Brigette Zacharczenko** was awarded the Harry K. Clench Memorial Award for her first place student paper at the 2015 Lepidopterists' Society Meeting in July.

Al Avitabile, emeritus professor and former Director of the Waterbury Campus, was recently honored with the CT Beekeeper of the Year Award by the Connecticut Beekeepers Association. He is the coauthor of the Beekeeper's Handbook, now in its 4th edition! http://www.amazon.com/Beekeepers-Handbook-Diana-Sammataro/dp/0801476941/ref=sr\_1\_1? s=books&ie=UTF8&qid=1444317181&sr=1-1&keywords=beekeeper%27s+handbook

Al also was honored earlier this year by The Northeast Organic Farming Association of Connecticut as its Member of the Year.

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## **GRANTS**

**Margaret Rubega** is the PI along with Co-PIs Bob Wyss and **Bob Capers** on the \$.5M NRT-IGE grant: *Training STEM Graduates to Communicate in the Digital Age, and Measuring Whether It Works* 

**Louise Lewis** is a collaborative grant partner on the \$1.79M GoLife project: *Filling the largest void of the fungal genealogy of life (the Pezizomycotina) and integrating symbiotic, environmental and physiological data layer* 

**Michael Finiguerra**, UConn Avery Point Campus, is the PI on a pedagogy project (Co-PI: R. Gabriel) looking at what factors affect coastal literacy among high school students in CT (\$150,000). Dr. Finiguerra is also the Co-PI (PI:H. Dam and Co-Pi: H. Baumann) on the combined effects of climate change and ocean acidification on a coastal copepod (\$149,000). Both these grants are CT Sea Grant awards.

Andrew Frank, Ph.D. student working in Elizabeth Jockusch's lab, has received a research grant from the Society of Systematic Biology. This grant will support a mixture of field and lab work on his skink speciation project.

## **ALUMNI NEWS**

**Jenica Allen,** Ph.D. 2012, has accepted a tenure track Assistant Professor position as a Quantitative Ecologist at the University of New Hampshire.

**Chris Martine**, Ph.D. 2006, continues his botany blog in The Huffington Post. It can be found at: <u>http://www.huffingtonpost.com/dr-chris-martine/why-im-naming-a-new-plant\_b\_8190242.html</u>