

## EEB'S BIODIVERSITY RESEARCH COLLECTIONS OPENS NEW EXHIBIT

The exhibit is the first public introduction to the Carl and Marian Rettenmeyer Army Ant Guest Collection, which is considered one of the premier collections of its kind in the world. It consists of more than two million specimens, field notes, and other material from research conducted by the late Carl Rettenmeyer, a faculty member in the Department of Ecology and Evolutionary Biology from 1971 to 1996, and his wife Marian. The exhibit opened to the public in April 2017 and runs through 2019. It is open Monday through Friday from 8 a.m. to 5 p.m.



Photo by Peter Moraneus/UConn

The Rettenmeyers worked in Central and South America for 50 years studying the intricacies of the complex societies of army ants that are constantly foraging and moving along the ground, consuming up to 500,000 prey animals each day, such as earthworms, other insects, and larvae. Army ant societies are complemented by numerous “guests,” the many creatures, including mites, beetles, flies, wasps, springtails, and bristletails, that are intimately associated with the ants and benefit from their active daily life.

The exhibit is one of the initial results of a partnership between the Department of Ecology and Evolutionary Biology and the Connecticut State Museum of Natural History – which Carl Rettenmeyer founded – to curate, digitize, and catalogue the Rettenmeyer collection and its associated materials under a three-year, \$500,000 grant from the National Science Foundation (NSF). In addition to hundreds of thousands of specimens of about 114 species of army ants, the collection includes 92,000 specimens of guests representing 187 species. The grant will also fund the development of an online database to provide researchers and the public with access to the various elements of the collection.

“This exhibit helps to fulfill one of the primary goals of the NSF grant, which is to make the Rettenmeyer collection available to the broader scientific community and to the general public,” says Janine Caira, Board of Trustees Distinguished Professor of Ecology and Evolutionary Biology. “The Rettenmeyers’ work teaches us that one needs to look carefully and closely if the wonders of the natural world are to be fully revealed. Their approach showed that what initially appeared to be a simple system was, in fact, fantastically complex. The challenge in developing an exhibit to share the wonders of their work and this system with visitors was one of scale. The majority of the guests are microscopic and many have evolved over time to resemble their ant hosts. Since we couldn’t scale visitors [to the exhibit] down, our solution was to scale the army ants and their guests up!”

*...continued on page 2*

## Army Ants Exhibit in Biodiversity Research Collections con't....

Throughout the exhibit, visitors are encouraged to discover guests portrayed in a variety of ways. A 12-foot-tall model of an army ant soldier welcomes visitors and includes eight different cryptic mites attached to various parts of its body. Floor lighting of silhouettes of army ants and some of the guests that run with them in their emigration columns illustrate the remarkable resemblance between the ants and their beetle guests. Hundreds of photographs taken with light and scanning electron microscopes reveal the marvelous diversity and intimate associations of army ant guests. Visitors are invited to apply their new-found knowledge of this system to locate guests in a series of photographs of army ants in nature.

The lower portion of the display focuses on the highly diverse guests. Some have intimate associations with an individual ant, while others live among the throng of the colony. Army ants and their guests represent an astoundingly complex biological system. Together, these hundreds of species have coevolved over millennia to harness the rich resources of tropical rainforests.

The exhibit is a collaborative effort between NSF project personnel from the Department of Ecology and Evolutionary Biology, Cairá, Jane O'Donnell, Geert Goemans, and Bernard Goffinet. Elizabeth Barbeau provided content for the exhibit, and Collin Harty, exhibit developer for the Connecticut State Museum of Natural History, designed and created the exhibit. The giant army ant with guests was created by Michael Anderson, chief exhibit preparatory at Yale Peabody Museum of Natural History and a noted sculptor. Michael Chybowski, associate professor of lighting design in the Department of Dramatic Arts, assisted with the strategy for displaying floor images.

The exhibit opened on April 29, 2017 with Marian Rettenmeyer in attendance. UConn alumnus Rob Dunn '03 Ph.D., professor of applied ecology at North Carolina State University, was the keynote speaker. He spoke on his new book, *Never Out of Season: How Having the Food We Want When We Want It Threatens Our Food Supply and our Future* (Little Brown, 2017). The event included a variety of activities including microscopes with real guest specimens, a tour of the Rettenmeyer Collection, a live fungus-growing ant colony, and special Dairy Bar AntU ice cream.

"Be Our Guest: An exhibit on the Complex Society of Army Ants and Their Guests" continues Monday through Friday from 8 a.m. to 5 p.m. at the Biology/Physics Building 91 N. Eagleville Road, Storrs through 2019. For more information go to [biodiversity.uconn.edu/ant-guests/](http://biodiversity.uconn.edu/ant-guests/). Parking is available in Lot 9 adjacent to the Lodewick Visitors Center and in the North Parking Garage, located at 103 North Eagleville Road. The lot and the garage are a short walking distance to the Biology/Physics Building.

North Eagleville Road is undergoing a major construction project and is a one-way street running west to east from Discovery Drive to Route 195 (Storrs Road) until late August.



## EEB WELCOMES NEW FACULTY

In August, 2016 EEB welcomed Dr. **Carlos Garcia-Robledo** as an Assistant Professor. Carlos comes to EEB from the Department of Botany at the National Museum of Natural History Smithsonian. Carlos' research focuses on the evolutionary ecology of plant-insect interactions; adaptation to novel environments, molecular biology, insect physiology, demography.

Also last fall, EEB welcomed Dr. **Erin Kuprewicz** as an Assistant Research Professor. Erin, too, came to EEB from National Museum of Natural History Smithsonian. Erin's research focuses on plant-animal interactions (tropical mammals and insects); behavioral ecology of terrestrial mammal seed dispersers; barriers to plant migrations in the Anthropocene.

In August, 2017, Dr. **Miranda Davis** will join EEB as an Assistant Professor in Residence. Miranda's research focuses on wildlife population dynamics and the ecological interactions among large mammal populations; how large mammal populations (specifically carnivores, ungulates) coexist and how these communities can be managed and conserved.

Dr. **Jeff Seemann** joined EEB in June, 2017 as a Professor. Jeff started his career in Population Biology at Stanford (at the same time as Kent Holsinger), and went on to do more and more biochemically oriented work on the effects of increasing CO<sub>2</sub> on photosynthesis. Jeff has held a number of administrative positions, most recently as the Vice President for Research here at UConn. His current interests are in plant physiological ecology and global change.

In August, 2017, EEB will welcome Dr. **Sarah Knutie** to our faculty as an Assistant Professor. Dr. Knutie joins us from Dr. Jason Rohr's lab at University of South Florida. Sarah's research spans both fundamental and applied ideas in ecology, particularly with host-parasite systems. In Dr. Rohr's lab, Sarah's research included the study of the role of host-associated microbiota in disease ecology.

## ALUMNI NEWS

Dr. **Chris Field**, Ph.D. 2016, has accepted a 2-year postdoctoral fellowship at the National Socio-Environmental Synthesis Center (SESYNC) at the University of Maryland.

Dr. **Uzay Sezen**, Ph.D. 2007, has accepted a position as a biologist with the Smithsonian Environmental Research Center in Edgewater, MD.

Dr. **Beth Wade**, Ph.D. 2014, has accepted a position at Curry College in Milton, MA.

Dr. **Nora Mitchell**, Ph.D. 2017, recently started a postdoctoral fellowship in Dr. Ken Whitney's Lab at the University of New Mexico.

Dr. **Chris Martine**, Ph.D. 2006, Bucknell University, recently named, with the help of 7th grade students at the Donald H. Eichorn Middle School in Lewisburg, PA, a new species of *Solanum* (bush tomato). The story can be found here: <http://www.philly.com/philly/health/science/pa-7th-graders-help-name-new-bloody-plant-species-20170522.html>

## EEB IN THE NEWS

Below are a few articles, as well as new books, that may interest you:

**The Key to Protecting Life on Earth May Be Barcoding It**—[Ben Panko](#), Smithsonian ([Garcia-Robledo](#)) - <http://www.smithsonianmag.com/science-nature/how-dna-barcoding-opens-new-doors-conservation-180963431/#56rzPP5tAACacelA.99>

**The New Game of Russian Roulette for Fire-Prone Ecosystems** [Kristen Cole](#), UConn Communications - <http://today.uconn.edu/2017/04/new-game-russian-roulette-fire-prone-ecosystems/>  
Silander, Merow, Slingsby

**Climate Change Puts Invasive Plants on the Move** - [Kristen Cole](#), UConn Communications - <http://today.uconn.edu/2017/03/climate-change-puts-invasive-plants-move/>  
Silander et al.

**Kelp Farming Study Proposed** - [Rick Brand](#), Newsday - <http://www.newsday.com/long-island/suffolk/proposal-to-study-sugar-kelp-cultivation-in-peconic-bay-1.10078791>  
Yarish

**Introducing the CLAS Class of 2017** - [Kevin Burgio](#), Ph.D. EEB  
<http://clas.uconn.edu/class-of-2017/> - [burgio](#)

**Ticking Biological Clock: Migratory Birds Arriving Late to Breeding Ground**—UConn Today—[Loretta Waldman](#), UConn Communications—[Tingley](#) <http://today.uconn.edu/2017/05/ticking-biological-clock-migratory-birds-arriving-late-breeding-grounds/>

### [Robert Thorson Releases New Book "The Boatman: Henry David Thoreau's River Years"](#)

**Robert W. Thorson's** new book entitled, *The Boatman: Henry David Thoreau's River Years* was recently released.

As a backyard naturalist and river enthusiast, Thorson was keenly aware of the way humans had altered the waterways and meadows of his beloved Concord River Valley. And he recognized that he himself—a land surveyor by trade—was as complicit in these transformations as the bankers, lawyers, builders, landowners, and elected officials who were his clients. Thorson tells a compelling story of intellectual growth, as Thoreau moved from anger, to lament, to acceptance of the way humans had changed the river he cherished more than Walden Pond.

### [Gene Likens Releases Book "Hubbard Brook: The Story of a Forest Ecosystem"](#)

Richard T. Holmes and **Gene E. Likens** have co-authored a book on the Hubbard Brook forest in the White Mountains of New Hampshire. The book has received the 2017 New England Society Book Award as well as the 2017 PROSE (Professional and Scholarly Excellence) Award in the Biological Science category.

For more than 50 years, the Hubbard Brook Experimental Forest in has been one of the most intensely studied landscapes on earth. This book highlights many of the important ecological findings amassed during the long-term research conducted there, and considers their regional, national, and global implications.

## AWARDS

### GRADUATE STUDENTS

**Liz Clifton**, working in Eldridge Adams' lab, received a Grant-In-Aid for Research from Sigma Xi as well as a Research Fellowship from the Organization for Tropical Studies. She is working at La Selva Biological Station in Costa Rica this summer. Liz's research focuses on individual and collective behavior of social insects during conflict.

**Samantha Apgar**, working in Chris Elphick's lab, was awarded The Garden Club of America's Coastal Wetlands Scholarship for her dissertation work on extinction risk in specialist marsh birds.

**Anna Sjodin**, working in Mike Willig's lab, received a Grant-In-Aid for Research from Sigma Xi for her project on viromes of bats in Puerto Rico. Anna also received a grant from the Royal Society of Tropical Medicine and Hygiene for her project entitled, "**A crown of thorns? Coronavirus diversity in Puerto Rican bats and implications for public health monitoring.**"

**Kaitlin Gallagher**, working in Janine Caira's lab, was awarded a Sigma Xi grant to support her transcriptome work on "the weird worm," *Litobothrium aenigmaticum*, from pelagic thresher sharks.

**Andrew Frank**, working in Elizabeth Jockusch's lab, was awarded a grant from The Lewis and Clark Fund of the American Philosophical Society. The grant will fund his remaining field work on visual ecology and reticulate evolution in California skinks.

**Chris Nadeau**, working in Mark Urbans's lab, won the Second Century Stewardship Fellowship from AAAS, Schoodic Institute, and Acadia National Park. The Fellowship will support his research in Maine on zooplankton ecological and evolutionary responses to climate change in rock pool crustaceans.

**Holly Brown**, working in Margaret Rubega's lab, was awarded the University of Connecticut Outstanding Graduate Teaching Award.

### STAFF

**Robert S. Capers** (CONN's collection manager) and Nancy G. Slack are being recognized by the [New England Botanical Club](#)'s Merritt Lyndon [Fernald Award](#) for the Best Paper published in *Rhodora* Volume 118 (2016) for their paper entitled "A baseline study of alpine snowbed and rill communities on Mount Washington, NH" (*Rhodora* 118: 345–381).

### ALUMNI

**Chris Field**, Ph.D. 2016, Chris Elphick, advisor, was awarded the 2017 Greg and Mona Anderson Best Dissertation Award. The cash award and certificate are presented for the best thesis in the general areas of systematics and/or ecology and evolution.

## AWARDS

### UNDERGRADUATE AWARDS IN BIOLOGICAL SCIENCES

The following undergraduates, working with EEB faculty, received awards at the 2017 Biology Undergraduate Research Colloquium:

**Dinah Parker** (Dr. Bernard Goffinet) received the 2017 Margaret F. Ertman Award.

**Diler Haji** (Dr. Chris Simon) received the 2017 Connecticut Museum of Natural History. In addition, Diler was awarded a NSF Graduate Research Fellowship Program award; he will begin his Master's degree this fall working in Chris Simon's lab.

**Michael Stankov** (Dr. Chris Elphick) received the 2017 Outstanding Senior in EEB Award.

### SUMMER UNDERGRADUATE RESEARCH FUND (SURF) AWARDS

The following undergraduate students, mentored by EEB faculty, received 2017 SURF Grants:

**Adam Chiu** (2018) is working with Dr. Elizabeth Jockusch. Adam's research project is titled: *Parametrization of RNA Interference Variables in Onopletus fasciatus, on Emerging Model Hemipteran*

**Weston Henry** (2019) is working with Dr. Dave Wagner. Weston's research project is titled: *Conservation and Habitat Restoration of the Globally Imperiled Northern Metalmark Butterfly (Calephelis borealis) (Lepidoptera: Rioninidae)*

**Nicholas Russo** (2018) is working with Dr. Morgan Tingley. Nick's research project is titled: *Avian Spring Migration as a Dispersal Mechanism for an Invasive Insect Pest.*

### GRADUATE STUDENTS

The EEB Department awarded nearly \$29,000 in awards to 26 graduate students during its annual award competition this spring.

Awards for botany research were granted to: **Charles DeLavois, Vandana Gurung, Amy LaFountain, Jason Lech, Valerie Milici, Eileen Schaub, Lauren Stanley, Elizaveta Terlova, Samantha Walter, and Tanisha Williams.**

Awards for zoology research were granted to: **Samantha Apgar, Elizabeth Clifton, Rebeca Colby, Annette Evans, Cera Fisher, Andrew Frank, Kaitlin Gallagher, Eliza Grames, Michael Hutson, Tanner Matson, Sara Pedro, Jaleigh Pier, Anna Sjodin, Austin Spence, Andrew Stillman, and Katherine Taylor**

## ***EEB FACULTY AND STAFF TEACHING EXCELLENCE RECOGNIZED***

**Fifteen EEB faculty and staff were recognized by the Provost for teaching excellence. Storrs Campus:** Eldridge Adams, Jeff Divino, Chris Elphick, Adam Fry, Carlos Garcia-Robledo, Kent Holsinger, Don Les, Jane O'Donnell, Margaret Rubega, and Morgan Tingley. **Hartford Campus:** Felix Coe. **Avery Point Campus:** Michael Finiguerra, **Waterbury Campus:** Paula Philbrick and Steve Trumbo. **Stamford Campus:** Claudia Kramer

## ***PUBLICATIONS***

Gorman, L., Kraemer G.P., **Yarish C.**, Boo S.M. and **Kim J.K.** 2017. The effects of temperature on the growth and nitrogen content of *Gracilaria vermiculophylla* and *Gracilaria tikvahiae* from LIS, USA. *Algae* 32(1): 57-66 (doi.org/10.4490/algae.2017.32.1.30).

**Kim J.K.**, **C. Yarish**, E.K. Hwang, M.S. Park and Y.D. Kim (in press) Seaweed aquaculture: cultivation technologies, challenges and its ecosystem services. *Algae* 32(1): 1-13 (doi.org/10.4490/algae.2017.32.3.3).

Zhang, J., **J.K. Kim**, **C. Yarish** and P. He. 2016. The expansion of *Ulva prolifera* O.F. Müller macroalgal blooms in the Yellow Sea, PR China, through asexual reproduction. *Marine Pollution Bulletin*. 104(1-2):101-6. DOI: 10.1016/j.marpolbul.2016.01.056.

**Kim, J.K.**, **C. Yarish** & R. Pereira. Tolerances to Hypo-Osmotic and Temperature Stresses in Native and Invasive *Gracilaria* Species to the US East Coast. *Phycologia* 55 (3), 257–264, DOI: 10.2216/15-90.1.

Cottier-Cook, E.J., Nagabhatla, N., Badis, Y., Campbell, M., Chopin, T, Dai, W, Fang, J., He, P, Hewitt, C, Kim, G. H., Huo, Y, Jiang, Z, Kema, G, Li, X, Liu, F, Liu, H, Liu, Y, Lu, Q, Luo, Q, Mao, Y, Msuya, F. E, Rebours, C, Shen, H., Stentiford, G. D., **Yarish, C**, Wu, H, Yang, X, Zhang, J, Zhou, Y, Gachon, C. M. M. (2016). Safeguarding the future of the global seaweed aquaculture industry. United Nations University (INWEH) and Scottish Association for Marine Science Policy Brief. ISBN 978-92-808-6080-1. 12pp.

Chao, A., **R. K. Colwell**, C. H. Chiu, and D. Townsend. 2017. Seen once or more than once: applying Good–Turing theory to estimate species richness using only unique observations and a species list. *Methods in Ecology and Evolution*.

**Spence, Austin R.**, et al. 2017. Physiological Correlates of Multiple Parasitic Infections in Side-Blotched Lizards. *Physiological and Biochemical Zoology* 90.3 (2017): 000-000.

**Smith, F.W.**, T.C. Boothby, I. Giovannini, L. Rebecchi, **E.L. Jockusch**, and B. Goldstein. 2016. The compact body plan of tardigrades evolved by the loss of a large body region. *Current Biology* 26:1–6. doi: 10.1016/j.cub.2015.11.059

## PUBLICATIONS

Pecl, G. T., M. B. Araújo, J. D. Bell, J. Blanchard, T. C. Bonebrake, I.-C. Chen, T. D. Clark, **R. K. Colwell**, F. Danielsen, B. Evengård, et al. 2017. Biodiversity redistribution under climate change: Impacts on ecosystems and human well-being. *Science* 355: eaai9214. <http://dx.doi.org/10.1126/science.aai9214>

Buchanan, B., A. Chao, C.-H. Chiu, **R. K. Colwell**, M. J. O'Brien, A. Werner, and M. I. Eren. 2017. Environment-induced changes in selective constraints on social learning during the peopling of the Americas. *Scientific Reports* 7.

**Bagchi, R.**, D. G. Hole, S. H. M. Butchart, Y.C. Collingham, L. D. Fishpool, A. J. Plumptre, I. Owunji, H. Mugabe, S. G. Willis (2017) Forecasting potential routes for movement of endemic birds among important sites for biodiversity in the Albertine Rift under projected climate change. *Ecography*. 10.1111/ecog.02712 <http://onlinelibrary.wiley.com/doi/10.1111/ecog.02712/abstract>

Hudson, L. N. et al. (511 authors including **M. R. Willig**). 2017. The database of the PREDICTS (Projecting Responses of Ecological Diversity in Changing Terrestrial Systems) Project. *Ecology and Evolution* 7:145-188. doi:10.1002/ece3.2579.

Martins, A. C. M., **M. R. Willig**, **S. J. Presley**, and J. Marinho-Filho. 20107. Effects of forest height and vertical complexity on abundance and biodiversity of bats in Amazonia. *Journal of Forest Ecology and Management* 391:427-435. doi: [10.1016/j.foreco.2017.02.039](https://doi.org/10.1016/j.foreco.2017.02.039).

**Chazdon, R. L.** 2017. Forest succession and human agency in an uncertain future. In: W. J. Kress and J. K. Stine, Eds. *Living in the Anthropocene: Humanity in the age of humans*. Smithsonian Institution Press. Washington, D. C. (in press)

**Chazdon, R. L.** and J. M. Rey Beneyas. 2017. Ecological restoration and ecosystem services. Chapter 40 in S. Allison and S. Murphy, Eds. *Routledge Handbook of Ecological and Environmental Restoration* (in press)

Brancalion, P. H. and **R. L. Chazdon**. 2017. Beyond hectares: Four principles to guide reforestation in the context of tropical forest and landscape restoration. *Restoration Ecology*, in press.

**Chazdon, R. L.** 2017. Landscape restoration, natural regeneration, and the forests of the future. *Annals of the Missouri Botanical Garden* 102(2), in press.

Roberts, SG, RA Kern, MA Etterson, **KJ Ruskin**, **CS Elphick**, BJ Olsen, and WG Shriver. 2017. Factors that influence Seaside and Saltmarsh sparrow vital rates in coastal New Jersey, USA. *Journal of Field Ornithology*. (accepted)

Walsh, J, IJ Lovette, V Winder, **CS Elphick**, BJ Olsen, WG Shriver, and AI Kovach. 2017. Subspecies delineation amid phenotypic, geographic, and genetic discordance in a songbird. *Molecular Ecology* 26:1242-1255. [[pdf](#)]



## PUBLICATIONS

Walsh, J, WG Shriver, MD Correll, BJ Olsen, **CS Elphick**, TP Hodgman, RJ Rowe, KM O'Brien, and AI Kovach. 2017. Temporal shifts in the saltmarsh-Nelson's sparrow hybrid zone revealed by population surveys and genetic data. *Conservation Genetics* 18:453-466. [[pdf](#)]

Watanabe, S. and **L.A. Lewis** (2017) Phylogenetic interpretation of light and electron microscopic features of selected members of the phylogroup *Moewusinia* (Chlorophyceae), with new generic taxonomy. *Phycologia* 56: 329-353. doi: <http://dx.doi.org/10.2216/16-64.1>

Holzinger, A., K. Herburger, K. Blaas., **L.A. Lewis** and U. Karsten (2017) The terrestrial green macroalga *Prasiola calophylla* (Trebouxiophyceae, Chlorophyta): ecophysiological performance under water limiting conditions. *Protoplasma*. doi: <http://dx.doi.org/10.1007/s00709-016-1068-6>

**Richmond, M. P.**, J. Park, and **C. S. Henry**. 2016. The function and evolution of male and female genitalia in *Phyllophaga* Harris scarab beetles (Coleoptera: Scarabaeidae). *Journal of Evolutionary Biology*: 1-13. DOI: 10.1111/jeb.12955

Duelli, P., **C. S. Henry**, M. Hayashi, M. Nomura, and A. Mochizuki. 2016. Molecular phylogeny and morphology of *Pseudomallada* (Neuroptera: Chrysopidae), one of the largest genera within Chrysopidae. *Zoological Journal of the Linnean Society*: 1-14. DOI: 10.1093/zoolinnean/zlw008

Mochizuki, A., **C. S. Henry**, and P. Duelli. 2017. *Apertochrysa* (Neuroptera: Chrysopidae): A heterogeneric phantom? . *Zootaxa* 4238: 058–072. DOI: 10.11646/zootaxa.4238.1.4

**Slingsby, J.A.**, **C. Merow**, **M. Aiello-Lammens**, N. Allsopp, S. Hall, **H. Kilroy Mollmann**, R. Turner, **A. M. Wilson**, v Intensifying postfire weather and biological invasion drive species loss in a Mediterranean-type biodiversity hotspot. *PNAS*. doi: 10.6084/m9.figshare.4737358.

**Merow, C.**, **S. Treanor Bois**, **J.M. Allen**, **Y. Xie** and **J.A. Silander Jr.** 2017. Climate change both facilitates and inhibits invasive plant ranges in New England. *PNAS*. doi: 10.1073/pnas.1609633114

Brewer, J., Gelfand, M., Jackson, J. C., MacDonald, I. F., Peregrine, P. N., Richerson, P. J., **Turchin, P.**, Whitehouse, H., Wilson, D. S. 2017. *Nature Ecology & Evolution* **1**, 0070. doi:10.1038/s41559-017-0070

Huo, Y., H. Han, L. Hua, Z. Wei, K. Yu, H. Shi, **J. K. Kim**, **C. Yarish**, and P. He. 2016. Tracing the origin of green macroalgal blooms based on the large scale spatio-temporal distribution of *Ulva* microscopic propagules and settled mature *Ulva* vegetative thalli in coastal regions of the Yellow Sea, China. *Harmful Algae* 59: 91–99 (<http://dx.doi.org/10.1016/j.hal.2016.09.005>).

G.P. Kraemer, **C. Yarish**, **Kim J.K.**, Z. Huang and S. Lin. Assessing the success of native *Chondrus crispus* and non-native competitor *Grateloupia turuturu* by spore output, dispersal, early growth and physical disturbance. *Phycologia* 56(2):176-1859 (doi.org/10.2216/16-72.1).