

PHYSIOLOGICAL ECOLOGY SECTION, 2010

MISSION, OFFICERS, AND MEMBERSHIP The Physiological Ecology Section promotes research and teaching that explore interrelationships among the functions of organisms and their environments. As of January 2010, Kiona Ogle (University of Wyoming) completed her term as Secretary of the Section. Jennifer Funk (Chapman University) took over for a two-year term, with goals of working toward supporting student attendance at ESA and participation in the student awards competition, as well as recruiting innovative, inter-disciplinary symposia. Zoe Cardon (Marine Biological Laboratory) is serving her second year as President. During autumn 2010, a new President will be elected. Webmaster Rob Jackson continues his long-term service to the section; our web site is <http://www.biology.duke.edu/jackson/ecophys/>.

We have broad section membership, and many members are also part of the Biogeosciences, Education, Rangeland Ecology, Researchers at Undergraduate Institutions, Soil Ecology, Urban Ecosystem Ecology, and Vegetation Sections. This year, our Section-sponsored symposium planned for Pittsburgh (see below) -- organized by Lauren Buckley (Univ. of North Carolina), Amy Angert (Colorado State Univ.), and Lisa Crozier (NOAA Fisheries) -- aims to meld understanding of the traits/ecology/evolution of organisms (the "legacy of the past") with our need to understand/predict species ranges in a warmed world (the "challenge of our future").

STUDENT AWARDS

First, THANK YOU to all the judges who make it possible to offer these awards each year. Your efforts keep our Section's activities going; we greatly appreciate your willingness to serve.

- *Student Travel awards (new!)*
New student travel awards were instituted this year after a raffle fundraiser at the 2009 meeting and a generous donation from an anonymous donor. We had 13 applicants, and a panel of five judges selected winners based on (1) the student's research and on (2) the potential for attending the conference to contribute to the student's professional development. Five students are receiving \$500 each to help offset the cost of attending this year's ESA meetings; winners will be introduced at the Physiological Ecology Section Mixer in Pittsburgh. Upon learning about the five awardees, the anonymous donor was very impressed and has agreed to donate \$2500 each year for the next five years to support student travel to the ESA meetings.
- The Billings Award and the New Phytologist Poster Award are given to students each year to recognize significant advancements in physiological ecology. Students giving oral and poster presentations at the annual ESA meetings can enter, and entrants are judged on the rigor, creativity, importance, and quality of presentation of the research. The New Phytologist Trust has long contributed to the Billings Fund, which supports prizes for both the Billings Award and the New Phytologist Poster Award. Continuing thanks to New Phytologist Trust. Thanks also to Elsevier for supporting student efforts; since 2002, Elsevier has donated books to student winners and honorable mentions of the two award competitions. The competitions attracted 23 excellent entrants during 2009, and 24 students are signed up for the competitions at the 2010 Pittsburgh meetings. In Albuquerque, 2009, the winners and honorable mentions were:

Billings award, 2009

Winner: Doug Aubrey, University of Georgia, "Root-derived CO₂ efflux via xylem stream rivals soil CO₂ efflux" with co-author R.O. Teskey.

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Honorable mention: Greg Barron-Gafford, University of Arizona, “Integrating estimates of ecosystem respiration from eddy covariance towers with automated measures of soil respiration: Examining the development and influence of hysteresis in soil respiratory fluxes along a woody plant encroachment gradient” with co-authors R. Scott, G.D. Jennerette, and T.E. Huxman.

Honorable mention: Dena Vallano, Cornell University, “Effects of direct foliar uptake of gaseous nitrogen dioxide on plant-herbivore interactions” with co-author S. Campbell.

New Phytologist Poster award, 2009

Winner: Allyson Eller, Cornell University, presented a poster on “Influence of changing air chemistry on plant growth and reproduction: Effects of rising carbon dioxide, nitrogen dioxide, and ozone on a model species” with co-author J. Sparks.

SECTION ACTIVITIES AT THE PITTSBURGH 2010 ESA MEETING

Mixer and Business Meeting

At Pittsburgh, August 4 2010, our Physiological Ecology Section will hold its mixer and business meeting on **Wednesday evening, 6:30 PM-8:00 PM Blrm BC**, David L Lawrence Convention Center. Come early, come hungry, come thirsty, and come ready to discuss at least two (maybe more) section opportunities:

- (1) How we can best support ESA’s initiative in Planetary Stewardship?
- (2) How we can best allocate our new Student Travel funds, \$2500 each year, for the next 5 years?

Sponsored symposium and organized oral session at ESA in Pittsburgh, 2010

- **Symposium 7**, organized by Buckley, Angert, and Crozier, draws from efforts of a joint NCEAS-NESCent working group on species range dynamics, which was spurred by an ESA symposium in 2006 on “Thermal physiology as a biogeographic determinant”.

Tuesday, August 3, 2010: 1:30 PM-5:00 PM, Blrm A, David L Lawrence Convention Center
SYMP 7 - Does Biology (physiology, ecology, evolution) Matter in Predicting How Species’ Distributions Will Respond to Climate Change?

Organizer and moderator: Lauren B. Buckley, University of North Carolina at Chapel Hill
Co-organizers: Amy L. Angert, Colorado State University and Lisa G. Crozier, NOAA Fisheries

The symposium will ask what biological details should be considered when predicting climate-induced shifts in species’ ranges through investigating past responses to paleoclimate fluctuations, whether physiology and life history can predict responses, and how ecology and evolution influence responses. We will attempt to bridge between small-scale experimental studies where the biological details are thought to be crucial and broad-scale modeling efforts where the biological details are ignored. We intend the symposium to spur discussions that will guide the next generation of species’ distribution models.

- **OOS 19**, organized by Gutschick and moderated by BassiriRad, aims at trying to improve the dynamic vegetation models that will be key contributors to understanding vegetation response to climate change in the future.

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Tuesday, August 3, 2010: 1:30 PM-5:00 PM, 310-311, David L Lawrence Convention Center
OOS 19 - Gaps In Predicting Vegetation Change - Physiological and Genetic Variation and Extreme Events

Organizer: Vincent Gutschick, Global Change Consulting Consortium, Inc.

Moderator: Hormoz BassiriRad, University of Illinois at Chicago

Changes in climate, as well as direct effects of rising CO₂ as a photosynthetic substrate, are inducing changes in the distribution of plant species, as well as their physiological performance, ecological relations (competition, pollination, disease occurrence), and evolution. Prediction of such changes is clearly important for ecology, as also for climatology, via vegetation feedbacks to the carbon, nutrient, and water cycles and regional albedos. Current dynamic vegetation models use climatic responses of vegetation, commonly statistical, with a modest inclusion of physiological responsiveness. The climatic models fail to account for abiotic (and biotic) extreme events, which are poorly characterized, if at all, by gross climatic averages over time and space. Moreover, novel climates are likely to arise, for which there is no basis to estimate plant responses. Rarely included in the models are the direct effects of CO₂ on physiological performance, particularly resource-use efficiencies. Neither do models include the full, striking diversity of direct CO₂ responses among species. Dynamic models are also limited in their capability to represent time lags, on annual to multi-decadal scales, arising from dispersal dynamics and from rapid changes in community structure in pulse-dominated ecosystems. Finally, there is dramatic evidence of constraint in vegetation responses at the population level and above, as a result of population genetic structure. We review the evidence for vegetation changes, the challenges in proper attribution of vegetation changes, and the capabilities of models, current and future.

SECTION RESOURCES

Web site: Reminder! Our web site is <http://www.biology.duke.edu/jackson/ecophys/>. The web site is very dynamic and packed with information about:

- faculty, postdoc, graduate, technician, and undergraduate positions,
- meetings of interest to our membership and links to other societies
- resources for teaching and mentoring, time management, and writing
- books, equipment, and more!

Section booth at the ESA meetings: In 2009, we established the Physiological Ecology Section Booth at the annual meeting. The booth served as a Section focal point, featuring:

- an area to post job announcements
- a listing of all the student entrants in the award competitions (and the judging ballot box)
- display of the winning student poster from the 2008 meeting
- display of the new book “Perspectives in Biophysical Plant Ecophysiology” edited by section members Erick De la Barrera and William K. Smith
- a raffle-fundraiser to support student travel to the 2010 meetings

The raffle attracted the attention of an anonymous donor who has now promised \$2500 per year for the next 5 years to support student attendance at the meetings. We’ll have another booth this year in Pittsburgh – be sure to come by!

Submitted by: Zoe Cardon

President, Physiological Ecology Section, ESA