
Ecology & Evolutionary Biology

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Letter from the Chair

By Doug Morse

Ironically, just as the newsletter picks up steam, thanks to Marc Tatar's boundless energy, I find it time to write my final "Chair's Paragraph". After 22 years more or less at the helm, I'm stepping down as chair, so that others may have that rarified opportunity. By the time you receive the next newsletter, a new chair will be well ensconced. I'm on sabbatical next year, which made it a natural time to step down. We'll be in Melbourne most of the year, of course with field seasons in Maine on either end, and time to do some serious travelling as well. I'll be working in Mark

Elgar's lab in Melbourne, in part collaborating with Mark, who deals with sexual selection-type issues, a lot of it with big, yukky, orb-weaving spiders that think nothing of having their mate (male, that is!) for lunch. I'm also hoping to make serious progress in book writing. Drop us a line if you are coming through Melbourne; interestingly, we are already receiving some apparently serious inquiries on that issue!

The Selfless Task of the 'Self-study'

By Doug Morse

We've just finished writing a "Self-Study", an effort that has, on-and-off, consumed us for much of the year. As some of you know, this is an assessment, in our eyes, of the characteristics of the department: key variables (faculty, staff, students, grants, physical facilities, equipment, etc.), how they have changed and our predictions of how they will change in the future; what we think we are doing right and what needs improvement; how we might make that improvement; and (bottom line!) what resources we need to make that improvement. Whew! The "white paper" has been very much of a team effort, for which I thank all of the faculty. Annie Schmitt deserves special appreciation for editing all of the disjointed pieces we contributed into a coherent document. Comparison with earlier times provides an idea of how we have changed and how far we have come. When I arrived in September 1979, we were a Section of Population Biology and Genetics, with five faculty and no graduate program. Of the faculty here to greet me at that time, all but Jon Waage (the sole member of the new generation!) have long since retired or left (by the end of 1988). Meanwhile, we commenced to replace and to grow to our current size of 12 full-time faculty lines in the current department. We now have 17 graduate students and have thus far granted 28 Ph. D.'s and 6 M.S.'s. They, and our postdocs and undergraduates, have all done spectacularly well - congratulations to all of you! We have moved a number of times, but still remain spread out over a distressingly broad swath of the campus (currently Walter Hall, multiple floors and nooks of the Biomed Center, and the Greenhouse). We expect to move as a group into the current Neuroscience quarters in around 2005, though we'll truly believe it when it happens. In the mean time, we have laid out plain our plans for continued growth, development and integration. Many thanks to all for the work bringing us this far and then into the future.

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Undergraduate Honors Thesis Presentations

The seminar presentations of undergraduate research projects are often the highlight of the entire year. Even by this standard, the talks this year were exceptional. 15 students gave polished presentations of outstanding work. Many projects are well on the way toward publications and to national meetings this summer. And, as usual, a packed crowd in Walter Hall 102 left any latecomers out in the hall.

Daphna Buchsbaum: *The Effect of Experience and Rearing Environment on Juvenile Crab Spider *Misumena Vatia* Learning and Behavior*. Advisor: Douglass Morse

Brandon Finegold: *Evolutionary DNA Analysis of Galapagos Barnacles*. Advisor: David Rand

Zachary German: *QTL Analysis of a Resistance/Tolerance Tradeoff for Apical Meristem Damage in Recombinant/Inbred Lines of *Arabidopsis Thaliana**. Advisor: Johanna Schmitt

Kelly Gravuer: *Dispersal and Establishment Variation in Northern Blazing Star, a Rare New England Plant Species*. Advisor: Johanna Schmitt

Katherine Greenwald: *Analysis of the Developmental Behavior of a Polar Bear Cub (*Ursus Maritimus*) in Captivity*. Advisor: Jonathan Waage

Maryem-Fama Ismael Aguirre: *Chiropteran Clavicle Length Change During Flight Based on 3-D Kinematic Analysis and Mechanical Testing*. Advisor: Sharon Swartz

Sarah Kingan: *Does Sperm Competition Influence the Evolution of Seminal Proteins in the Great Apes?* Advisor: Marc Tatar and David Rand

Sarah Lee: *Spatial Displacement of the Snail *Melampus Bidentatus* by a Sympatric Salt Marsh Snail*. Advisor: Mark Bertness

Emily Lindsey: *Patterns of Benthic Community Structure: Differential Recruitment in Narragansett Bay, Rhode Island*. Advisor: Jon Witman

Rebecca Lutz: *Crippled Crabbies: Leg Loss and Movement Impairment in Male *Misumena Vatia**. Advisor: Douglass Morse

Robyn Neff: *Substrate Choice and Foraging Behavior of Naïve Crab Spiderlings *Misumena Vatia**. Advisor: Douglass Morse

Anita Pahuja: *Bacterial Population Response to Temperature Changes*. Advisor: Jennifer Hughes

Jeffrey Rasmussen: *Informant: An Approach to Microarray data analysis*. Advisor: David Rand

Michelle Rome: *The Foraging Ecology of Herring Gulls and Great Black-Backed Gulls on Appledore Island, Maine*. Advisor: Jon Witman

Andrew (Ole) Shelton: *Determining Growth and Population Structure of the Red Sea Urchin in a Southeast Alaskan Fjord*. Advisor: Jon Witman

Biology awards and premiums, 2002

Five graduating seniors from our group will be recognized at commencement for their exceptional academic records and independent research.

<u>Daphna Buchsbaum</u>	Richard J. Goss Biology Prize
<u>Kelly Gravuer</u>	Maria L. Caleel Prize for Academic Excellence
<u>Sarah Kingan</u>	Morris L. Povar Prize in Physiology and Zoology
<u>Sarah Lee</u>	Biology Prize
<u>Rebecca Lutz</u>	The James Kidwell Prize in Genetics and Population Biology

Graduate Student Research Update: A trophic cascade regulates salt marsh primary production

By Brian Silliman

Salt marshes are the dominant shoreline community along the East Coast and play a number of important roles in coastal ecosystems and economies. In addition to being highly productive, marshes temper coastal flooding, filter terrestrial runoff, act as nurseries for many commercially important species, and reduce erosion. Understanding the factors that influence the success of salt marsh plants is critical to the long-term preservation of these systems. For nearly 50 years, the prevailing paradigm in marsh systems has been that physical factors, such as nutrients and salinity, regulate marsh grass growth and that plant-grazer interactions are of little consequence to community dynamics. However, my dissertation research over the past 4 years has shown that the dominant marsh grazer (up to 1000 ind./ m²), the marsh periwinkle, *Littoraria irrorata*, exerts strong top-down control of marsh grass growth, and that this effect increases with marsh eutrophication. Experimental exclusion of snails in over 15 marshes, showed that *Littoraria*, long thought to be detritivore-specialist, commonly reduces marsh grass growth 40-80%. In addition, at commonly occurring high densities, snails actively mow down marsh grass, converting the most productive grassland in the world to a barren mudflat. Predator exclusion cages and tethering experiments showed that marine predators (e.g. the blue crab and terrapin) powerfully suppress the abundance of these potent grazers. Thus, marine predators, by controlling snail densities, indirectly facilitate the high levels of primary production observed in salt marsh communities. The discovery of this simple trophic cascade implies that over-harvesting of snail predators (e.g. blue crabs) may be an important factor contributing to the massive die-off (10s of km²) of salt marshes across the southeastern United States. In addition, these results contribute to a growing body of evidence indicating widespread, predator regulation of marine plant production via trophic cascades (kelps, seagrasses, intertidal algae) and suggest that the current paradigm in salt marsh ecology needs to be reevaluated.

News Update

Christine Janis is to be the key speaker at the 5th Congress for the International Association for the Study of Human Paleontology (Barcelona, Spain, May 3rd & 4th). Her talk is titled "The Origin and Evolution of the Woodland Savanna Biome".

Steve Hamburg is traveling to Mongolia in the summers. Last year he participated in the East Asian and Pacific region Long-Term Ecological Research Network meeting hosted by the Mongolian Academy of Sciences, this summer he returns for a workshop on climate change impacts within the permafrost regions of the northern latitudes.

The Watson Institute is participating in a grant from the Luce Foundation to develop an international environmental training program at Brown to support student research on international environmental research. Participants include visiting scholars from China, Uganda, Nepal, Philippines, Brazil, Mongolia, Cambodia, Tajikistan, Bolivia, Pakistan, Kenya and Mauritania.

EEB alums 'knock the cover off the ball'. **Jonathan Levine** (BS '97) is the 2002 recipient of the ESA Mercer Award. Jonathan is a starting assistant professor at UCLA this summer. **Mike Dickenson** (BS '83) was presented a McCarther Award for his work on insect flight. Mike is now at the California Institute of Technology. **Aaron Ellison** (Ph.D '87) just moved to a staff research position at the Harvard Forest.

Now that editing our newsletter is second nature (at least "the second issue") **Marc Tatar** has taken the task of founding co-Editor-in-Chief of a new journal to appear this year from Blackwell, *Aging Cell*.

The Schmitt lab is on the move. **Heidi Huber** and **Josef Stuefer** begin appointments as Assistant Professors at the University of Nijmegen. **Cynthia Weinig** leaves to join the Department of Plant Biology at the University of Minnesota as Assistant Professor.

Fulbright scholarships were awarded to Schmitt lab undergraduate **Kelly Gravuer** ('02) for New Zealand and to **Anna Aguilera** (lab manager) for Spain.

Graduate students were recognized by NSF with a pre-doctoral fellowship to **Liz Boyd**, honorable mentions to **Eric Von Wettberg** and **Rob Haney**, and a dissertation improvement grant to **Julie Ellis**.

Steve Gatesy has a new collaboration with Oliver Bimber at Fraunhofer CRCG, Inc. They are combining real fossil dinosaur footprints from Greenland with 3D animation in a virtual reality-type museum display technology called "Augmented Paleontology".

Kevin Middleton has accepted a Human Morphology postdoctoral position at Brown

University and will be working with **Sharon Swartz** on bone biomechanics.

Annie Schmitt is the current president of the American Society of Naturalists. She encourages EEB alums to come to this year's ASN meeting in Banff; see <http://www.amnat.org/> for details.

Former Schmitt lab postdoc **Kathleen Donohue** has recently left the faculty of the University of Kentucky to become an assistant professor at Harvard University. And former Schmitt lab postdoc **Massimo Pigliucci** has published a new book, *Phenotypic Plasticity: Beyond Nature and Nurture*, with Johns Hopkins Press

Sharon Swartz and colleagues across several departments are the recipient of an NSF grant from the course, Curriculum and Laboratory Improvement – Educational Materials Development Program. Their project, "Content-Rich Interactive Science Teaching and Learning System" will develop prototype web-based learning modules (CRISTALS) to provide information and facilitate problem solving using core scientific concepts applied to diverse interdisciplinary examples.

Also among EEB undergraduates, NSF predoctoral fellowships were awarded to **Sarah Lee '02** who will attend the University of North Carolina, to **Anne Leonard '01** who will attend the University of California, Davis and to **Johanna Kraus '99** who is at the University of Virginia

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## In the Greenhouse

By Fred Jackson

Springtime in the greenhouse is always hopping with



many different plants and experiments. Although we grow mostly plants from the field, the greenhouses take on the appearance of a garden center, with pots of

geraniums, petunias, and impatiens to name a few. These plants are grown for grounds and commencement, keeping with the yearly tradition. On the research front, Mark Bertness, Caitlin Mullan and lab have been vigilantly planting marsh plants like *Spartina*, *Salicornia*, and *Limonium* to study salinity tolerance. Annie Schmitt and Post doc John Stinchcombe are gearing up for a big *Impatiens capensis* experiment entitled "Evolution of plant growth rates in response to density and far red light". Last, but not least, grad student Yuko Toyonaga is working diligently on *Arabidopsis thaliana* studying the nutrient effects on flowering time.

## Teaching News

### EEB Coral Reefers have another successful tropical field trip

By Mark Bertness

This past January EEB graduate students and faculty participated in the semi-regular EEB graduate student field course. This was the 6<sup>th</sup> EEB field trip to Belize, but the first trip not to be staged out of the Pancentia Point region of Southern Belize. Our change in venue was forced since Skip White, the colorful, ex-patriot owner of the Turtle Inn, sold it to the film director Francis Ford Copola who immediately turned it into an upscale get away for his friends and an ecotourist trap out of our price range. Skip rode into the sunset looking for a new gig with a hefty 7 figure profit.

This year's trip was to Ambergris Cay, the largest island on the Belizean barrier reef. We stayed at Belize Marine TREK; a facility designed to host college groups. In many ways it was a perfect setting for the trip. The facility, located a short walk from the Caribbean village of San Pedro, had a small library, a swimming pool, nice rooms, good food and boats to take us to field sites. Faculty involved in the trip this year were Jen Hughes, Marc Tatar, and Mark Bertness. David Rand was scheduled to go, but ended up in the hospital with an appendectomy and complications that kept him out of commission for nearly a month. Carol Casper chaperoned and kept us from getting homesick for Rhode Island.

The students this year focused on four projects. Rob Haney, Adam Fry and Brian Silliman collected reef fish for examining phylogenetic relations and population structure questions back in the Rand lab. The morphology students, Kristin Bishop, David Bauer, and Jonna Hamilton, filmed hours of fish swimming to analyze lateral fin use as a function of body morphology and water movement. Eric Von Wettberg, Liz Boyd, Caitlin Mullan, Melissa Lage, Yuko Toyonaga, Brian Silliman and Andrew Altieri examined the potential role of herbivory in setting the distribution patterns of seagrass species. Dan Warren tortured small animals in a makeshift basement lab to



smashing successes. The students gave a Friday

compare respiratory water use efficiency between tropical and temperate organisms. All the projects were

Brown Bag seminar when they returned to share slides and project results with the rest of the group.

Highlights of the week-long trip included a day trip to the mainland where we traveled by boat through mangrove channels listening to Adam Fry narrate the bird fauna, visited a classical period Mayan city with ball courts and temples, had lunch in a rainforest lodge, and returned after dark in a starlit boat ride. We also visited a marine sanctuary where we saw huge groupers, large schools of parrot fish and numerous large spotted eagle rays and a place called shark and ray alley where we swam with dozens of stingrays and nurse sharks. We also went night snorkeling and spent a few evenings checking out and impersonating wildlife in San Pedro. The underwater film crew produced a video of the trip that included segments from all our adventures that was shown at one the weekly Walter Hall TGIF.

## Research Feature

By Cynthia Weinig

*Arabidopsis* possesses a unique life-history. Where winters are mild and summers harsh, natural populations exhibit a fixed winter annual life history; all seedlings germinate in fall, overwinter as vegetative rosettes, and flower and set seed in spring. In contrast, populations at northern latitudes often produce both fall and spring germination cohorts. It is therefore important to ask whether the strength or direction of natural selection differs among geographic regions, or between spring and fall germination cohorts within populations. Plants used in the current experiment represent 100 natural populations collected from a north-south latitudinal gradient. We are phenotyping plants to test hypotheses regarding adaptive differentiation in response to selection in different seasonal environments. Concurrent with this experiment, our collaborators are evaluating genetic variation at candidate loci, enabling us to evaluate the ecological relevance of developmental loci of known function.



**Arabidopsis plant flowering in the snow in a recent experiment conducted by J. Stinchcombe and C. Weinig from the Schmitt Lab.**

## In the Field ....

By Jon Witman

We had been there before, so the arid landscape with tall *Opuntia* cactus was familiar to us. But we were not prepared for the scene before us as we rounded the northern corner of Caamano Island. Dense jet-black aggregations of hundreds of marine iguanas covered the tops of lava boulders, framed against the backdrop of bright waves breaking in the late afternoon sun. Crimson - orange Sally Lightfoot crabs formed a contrasting border below the iguanas, completing the spectacular panorama. I remember the clattering sound the crabs made as they scurried out of the way as we approached. We, post- doc Jose “Kongo” Farina, PhD student Julie Ellis, and research technician Petra Wallem and I had traveled to the Galápagos Islands in January 2002 to study the influence of marine productivity on food webs above and below the water. The Galápagos provides a great setting to examine the influence of productivity on communities when you consider that approximately 20-50 % of new biological production in the global ocean originates from the Eastern Equatorial Pacific. How these high levels of primary production may subsidize terrestrial plant communities on islands like Caamano via fertilizing effects of sea lions and sea birds is unknown. Surprisingly, all of the theory on spatial subsidies from one ecosystem to another is based on passive transport of food and nutrients and doesn't incorporate the role of biological vectors (like birds and sea lions). On the underwater sides of the islands, it is likely that the high productivity creates strong bottom –up control (literally) of the subtidal invertebrate communities there. So with support from the Andrew Mellon Foundation, we spent a lot of time traveling from our base at the Charles Darwin Station in a bouncing fiberglass boat to sample nine islands representing areas with and without the especially high productivity of upwelling. A typical day began with SCUBA dives on steep rock walls to continue (NSF supported initially) monitoring assemblages of sponges, barnacles, ahermatypic corals, ascidians, their predators and to change temperature loggers or current meters. At some islands, Julie and Petra would jump off the boat onto the shore to take plant and soil samples to track the signature of sea bird guano or sea lion feces. We later “invaded” two islands, Caamano and Plazas, where sea lion colonies were large to conduct intensive spatially gridded sampling.



The fieldwork paid off. Underwater, we found that communities at upwelling sites change at a remarkably fast pace, that in a sense reflects the fast vertical currents there. For example, species richness increased 1.5 – 2 fold in a year, barnacles grew to 3 cm diameter (its not called *Megabalanus* for nothing) and approximately 38 % of the new barnacle biomass was consumed by predatory whelks and fish. A caging experiment indicated that whelks were strong interactors in the food web. On the islands, stable isotope analyses revealed that concentrations of nitrate and ammonia in the soil were 4 to 50 times higher (!) in the soils around sea lion colonies than away from them. The nutrient enrichment was restricted to small areas in the immediate vicinity of seal lion colonies, indicating that biological vectors of cross ecosystem transport are important and furthermore, that the scaling of theory on spatially subsidized food webs needs to be modified to consider the unique aspects of biological vectors. With the prospect that oceanic productivity will be modified by the incipient El Nino, we are anxious to work up or baseline data and return to the Galápagos to test hypotheses about what will happen to our targeted plant and subtidal invertebrate communities if upwelling shuts down in the El Nino climate.

## Spring 2002 Seminars

The Graduate Program in Ecology and Evolutionary Biology sponsors two weekly seminar series: Brown Bag Seminars for catching up on research and work in progress within EEB, and a more formal colloquium series featuring speakers from outside the university.

### Ecology & Evolutionary Biology Seminars

Speakers from around the country visit EEB as guests of faculty and the graduate program. These Monday seminars present the best of new research in the fields of Morphology, Behavior, Evolution and Ecology.

January 28, 2002 **Dr. Linden Higgins**, University of Massachusetts-Amherst. *Budgets in the real world: Fitness consequences of resource allocation decisions in a web-building spider.*

February 4, 2002 **Dr. Yongsong Huang**, Brown University. *A molecular and isotopic approach to understand environmental factors controlling the natural abundance of C3 and C4 plants.*

February 11, 2002 **Dr. Jerry Melillo**, Woods Hole Marine Institute, *The interaction between global carbon and nitrogen cycles: implications for carbon sequestration in terrestrial ecosystems.*

February 25, 2002 **Dr. Shripad Tuljapurkar**, Stanford University. *Growth rates & elasticities in random environments.*

March 4, 2002 **Dr. Matthew T. Carrano**, Stony Brook University. *Analyzing large-scale patterns in dinosaur evolution.*

March 18, 2002 **Dr. Kenneth Miller**, Brown University. *Time to abandon Darwin? The new challenge from "Intelligent Design."*

April 1, 2002 **Dr. Trudy Mackay**, North Carolina State University. *The nature of quantitative genetic variation: Lessons from drosophila.*

April 8, 2002 **Dr. Robert T. Paine**, University of Washington. *Alternative states in ecological assemblages: Their formation and significance.*

April 15, 2002 **Páll Marvín Jónsson**, University of Iceland. *Westmann Islands, Iceland: An explosion of birds and volcanoes. Subtitle: Puffins Here, Puffins There, Puffins Puffins Everywhere.*

April 22, 2002 **Martin Wikelski**, Princeton University. *Evolution of Body Size in the Galapagos Marine Iguana – Why Grow and Shrink ?*

April 29, 2002 **Eli Stahl**, University of Chicago. *Plant Disease Resistance Genes, from Evolutionary to Ecological Genetics.*

May 6, 2002 **Catherine Loudin**, University of Kansas. *Air Flow Around Insect Antennae and Interception of Chemical Signals from the Environment.*

### Brown Bag Seminars

This informal seminar series provides a time for members of the program to share current research and problems in a relaxed atmosphere. It serves as a sounding board for the new research of both students and faculty and promotes collaboration and interactions within the program.

February 8, 2002 **Dr. Cesar S. B. Costa**, Federal University of Rio Grande (FURG; Brazil). *Perturbation and Plant Competition in the Irregularly Flooded Marshes of Southern Brazil.*

February 15, 2002 **Christopher Siddon**, Graduate Student, Brown University. *Variation of consumer pressure: the role of habitats, multiple predators, and time.*

February 22, 2002 **Caitlin Mullan**, Graduate Student, Brown University. *Let's get physical, biological: life on an environmental gradient.*

March 1, 2002 **David Baier**, Graduate Student, Brown University. *Shoulder mechanics and the evolution of avian flight.*

March 8, 2002 **Daniel Warren**, Graduate Student, Brown University. *What happens when they can breathe again? Recovery of turtles from anoxic submergence.*

March 11, 2002 **Andrew Altieri**, Graduate Student, Brown University. *Relative importance of hypoxia and predation in the benthic community of Narragansett Bay, Rhode Island.*

March 15, 2002 **Dr. Jose Miguel Farina**, Mellon Postdoctoral Research Associate, Brown University, Dept. of Ecology & Evolutionary Biology. *From the sea to the land: analyzing some effects of marine vertebrates on terrestrial ecosystems.*

March 22, 2002 **Elizabeth W. Boyd**, Graduate Student, Brown University. *Maternal effects on seed germination in Arabidopsis thaliana.*

April 5, 2002 **Dr. Jon Witman**, Associate Professor, Brown University, Dept. of Ecology & Evolutionary Biology. *Community Ecology in the Galapagos Marine Reserve.*

April 12, 2002 **EEB Graduate Students**, Brown University. *Report on research conducted during field trip to Belize.*

## New Publications

- Janis, C.M., J. M. Theodor, and B. Boisvert.** 2002. *Locomotor evolution in camels revisited: a quantitative analysis of pedal morphology and the acquisition of the pacing gait.* Journal of Vertebrate Paleontology 22:110-120.
- Janis, C.M., J. Damuth and J.M. Theodor.** 2002. *The origins and evolution of the North American grassland biome: the story from the hoofed mammals.* Palaeogeography, Palaeoclimatology, Palaeoecology 117: 183-198.
- Arthur, M.A., S.P. Hamburg and T.G. Siccamo.** 2001. *The accuracy of allometric estimates of aboveground living biomass and nutrient contents of a northern hardwood forest.* Canadian Journal of Forest Research 31:11-17.
- Lin, T-C., S.P. Hamburg, Y-J. Hsia, H-B. King, L.-J. Wang and K.-C. Lin.** 2001. *Base cation leaching from the canopy of a subtropical rainforest in northeastern Taiwan.* Canadian Journal of Forest Research. 31:1156-1163
- Kirschbaum, M.U.F., B. Schlamadinger, M.G.R. Cannell, S.P. Hamburg, T. Karjalainen, W.A. Kurtz, S. Prisley, E.-D. Schulze and T.P. Singh.** 2001. *A generalized approach of accounting for carbon stock changes under the Kyoto Protocol.* Environmental Science and Policy 4:73-85.
- Neilson, C.B., P.M. Groffman, S.P. Hamburg, C.T. Driscoll, T.J. Fahey and J.P. Hardy.** 2001. *Freezing effects on carbon and nitrogen cycling in soils from a northern hardwood forest.* Soil Science Society of America Journal 65:1723-1730.
- Middleton, K.M.** 2001. *The morphological basis of hallucal orientation in extant birds.* Journal of Morphology 250 (1): 51-60.
- Gatesy, S.M.** 2001. *Skin impressions in Triassic theropod tracks as records of foot movement.* Bulletin of the Museum of Comparative Zoology 156(1):137-149.
- Jenkins, F.A. Jr., N.H. Shubin, S.M. Gatesy and K. Padian.** 2001. *A diminutive pterosaur (Pterosauria: Eudimorphonidae) from the Greenlandic Triassic.* Bulletin of the Museum of Comparative Zoology 156(1):151-170.
- Gatesy, S.M.** 2001. *The evolutionary history of the theropod caudal locomotor module.* Special Publication of the Peabody Museum of Natural History 333-350.
- Good, T.P., M. Tatar.** 2001. *Age-specific mortality and reproduction respond to adult dietary restriction in Drosophila melanogaster.* Journal of Insect Physiology 47: 1467-1473.
- Herman, W.S., M.Tatar.** 2001. *Juvenile hormone regulates longevity during reproductive diapause in the migratory monarch butterfly.* Proceeding Royal Society, B. London. 268: 2509-2514.
- Donohue, K., E. Hammond Pyle, D. Messiqua, M.S. Heschel, and J. Schmitt.** 2001. *Adaptive divergence in plasticity in natural populations of Impatiens capensis and its consequences for performance in novel habitats.* Evolution, 55:692-702.
- Munir, J., L.A. Dorn, K. Donohue, and J.Schmitt.** 2001. *The effect of maternal photoperiod on seasonal dormancy in Arabidopsis thaliana.* American Journal of Botany 88:1240-1249.
- Dixon, P., C. Weinig, and J. Schmitt.** 2001. *Responses to ambient UV radiation and R:FR vary between woodland and clearing populations of Impatiens capensis.* American Journal of Botany 88: 1401-1408
- Heschel, M.S., K.Donohue, and J. Schmitt.** 2002. *Population differentiation and natural selection for water-use efficiency in Impatiens capensis.* International Journal of Plant Science, in press.
- Hughes, J.B., G.C. Daily, and P.R. Ehrlich.** 2002. *Conservation of tropical forest birds in countryside habitats.* Ecology Letters 5: 121-129.
- Ives, A.R. and J.B. Hughes.** 2002. *General relationships between species diversity and stability in competitive systems.* American Naturalist 159: 388-395.
- Rand, D. M.** 2001. *The units of selection on mitochondrial DNA.* Annual Review of Ecology and Systematics 32: 415-448.
- Tatar, M. and D. M. Rand.** 2002. *Aging: Dietary advice on Q.* Science 295:54-55.
- Rand, D. M., P. S Spaeth., T Sackton, P. S. Schmidt.** 2002. *Ecological genetics of the Mpi and Gpi polymorphisms in the acorn barnacle and the spatial scale of locus-specific selection.* Integrative and Comparative Biology, in press.
- Witman, J.D. and F. Smith.** 2002. *Rapid community change at a tropical upwelling site in the Galapagos Marine Reserve.* Biodiversity and Conservation, in press
- Lucky, A., T.L. Erwin and J.D. Witman.** 2002. *Diversity of arboreal carabid beetles in Ecuadorian Amazonia.* Biotropica in press
- Witman, J.D., S.J. Genovese, J. F. Bruno, J. W. McLaughlin and B. I. Pavlin** *Massive prey recruitment and the control of rocky subtidal communities on large spatial scales.* Ecological Monographs, in press.
- Witman, J. D. , J. C. Ellis and W. B. Anderson,** 2002. *The influence of physical processes, organisms and permeability on cross ecosystem fluxes.* Chapter 24 in G.A.Polis, M. Power and G. Huxel eds. Food webs at the landscape level, Univ. of Chicago Press, in press
- Witman, J.D., M.R. Patterson and S.J. Genovese.** 2002. *Benthic -pelagic linkages in rocky subtidal communities: influence of food subsidy by internal waves* Chapter 10 in G.A.Polis, M. Power and G. Huxel eds. Food webs at the landscape level, Univ. of Chicago Press, in press

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## Feedback to the EEB Newsletter

We would like to hear from you!

*Comments and information are welcome to:*

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Name: \_\_\_\_\_ Undergraduate or Graduate – class Year \_\_\_\_\_

Advanced Degrees Date & Institution \_\_\_\_\_

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City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_ Telephone \_\_\_\_\_

Business Title: \_\_\_\_\_ Business Phone \_\_\_\_\_

Alumni Notes ( \_\_check if only for our files) \_\_\_\_\_

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Can we contact you for further information about your activities in Biology? \_\_\_yes \_\_\_no