

Tupper seminar

Tuesday, June 23, 4pm
Tupper seminar speaker will be Egbert Leigh, STRI
In what sense are ecological communities organized for maximum productivity?

BDG meeting

Tuesday, June 23 at 2pm,
the Behavior Discussion Group will meet at Tupper's Large Meeting Room, with Myra Hughey
Processes influencing the distribution and abundance of insects in a spatially structured environment

Paleo-talk

Wednesday, June 24, Paleo-talk speaker will be Sara Morón, STRI intern
Ideas on the tectonic development of the Canal and eastern Panama

Bambi seminar

Please check your Outlook e-mail for information on the next Bambi seminar on BCI. If you wish to give a seminar please contact Bambi Jefe Matt McElroy at mt.mcelroy@gmail.com

Arrivals

Erin Kurten and Clare Sherman, Stanford University, to study the effects of mammal abundance on the relationship between seed size and rates of seed predation, on BCI.

Lainy Day, University of Mississippi, to study the brain and behavior relationships in birds, in Gamboa.

Photo: Stefano Baldacci, Wikimedia



Smithsonian Tropical Research Institute, Panamá

www.stri.org

June 19, 2009

PNAS —One of Darwin's few major oversights: Eberhard

"In one of his few major oversights, Darwin failed to appreciate that male-male competition and sexual selection can continue even after copulation has begun." Postcopulatory sperm competition and female choice occur within the female's body.

In his latest article, "Postcopulatory sexual selection: Darwin's omission and its consequences," published by the *Proceedings of the National Academy of Sciences* on June 16, STRI's William G. Eberhard explains how recognizing this hidden but intense sexual competition provides new insights into a variety of fields, including the elaborate morphology of both sperm and male genitalia, the puzzling morphology of non-genitalic male structures, the effects of substances in male semen on female reproductive physiology, paradoxical male courtship behavior that occurs after copulation has already begun, variability in parental investments, and the complex interactions between sperm and female products that surround animal eggs and between male gametophytes and female tissues in flowering plants.

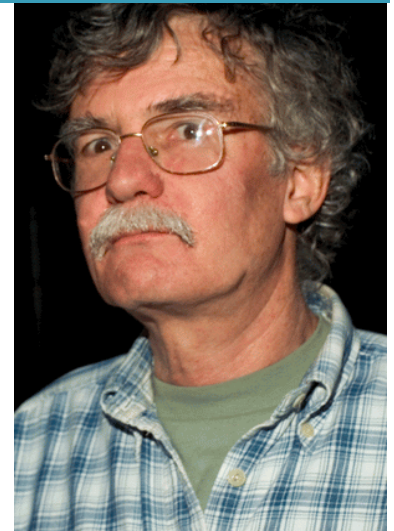
Many bizarre traits are involved, including male genitalia that

"sing" during copulation "and a virtual Kama Sutra of courtship behavior performed after, rather than before, genital coupling, including male-female dialogues during copulation."

This paper results from the Colloquium of the National Academy of Sciences, "In the Light of Evolution III: Two Centuries of Darwin," held January 16-17, 2009. You may obtain it from calderom@si.edu

"En uno de sus pocos descuidos, Darwin no notó que la competencia entre machos y la selección sexual puede continuar aún después de haber empezado la copulación." La competencia post-copulatoria y la selección de la hembra ocurre dentro de su cuerpo.

En su último artículo "Postcopulatory sexual selection: Darwin's omission and its consequences" [Selección sexual post-copulatoria: la omisión de Darwin y sus consecuencias] publicado por *Proceedings of the National Academy of Sciences* el 16 de junio, William G. Eberhard, de STRI, explica como el reconocimiento de esta intensa competencia sexual escondida ofrece muchas luces sobre una variedad de temas, incluyendo la elaborada morfología del



esperma, los genitales de los machos, así como la intrincada morfología de sus estructuras no genitales, los efectos de sustancias en su semen sobre la fisiología reproductora de las hembras, la paradójica conducta de cortejo luego de haber empezado la cópula, la variabilidad en las inversiones de los padres, y las complejas interacciones entre el esperma y los productos femeninos que rodean los huevos animales y aparecen entre los gametofitos del macho y los tejidos de la hembra en plantas en floración.

Hay muchas características bizarras en juego, como genitales en los machos que "cantan" durante la copulación, y "virtualmente un Kama Sutra en el comportamiento de cortejo que se lleva a cabo después y no antes de la copulación genital, como diálogos entre el macho y la hembra durante la cópula."

More arrivals

Grace Chen, Michigan State University, to study the effects of biotic interactions and abiotic stress on plant adaptation in the tropics, on BCI.

Christopher Freeman, University of Alabama at Birmingham, to conduct an experimental manipulation of light and its impact on sponge-cyanobacteria symbioses, on Bocas del Toro.

Robert Hodgkison, University of Ulm, Germany, to study the echolocation and foraging behavior of Neotropical bats, on BCI.

James Voirin, Max-Planck Institute for Ornithology, to study sleep in the three toed sloth (*Bradypus variegatus*).

Justine Li, Princeton University, to study intergroup relationships of white-faced capuchin monkeys (*Cebus capucinus*), on BCI.

Daniella Schweizer, University of California, Santa Cruz, to study the phylogenetic signal in the performance and health of tree species in mixed plantations, in Gamboa.

Peter Hietz, Charles Nock and Georg Weltin, Universität für Bodenkultur, Austria, to study global changes in the tropics, on BCI.

Katia Sivera, University of Nevada, to study crassulacean acid metabolism (CAM) in tropical plants, at Tupper.

Maurice Thomas, Palm Beach Atlantic University, to continue studies of reproductive patterns, community structure and population fluctuations of bats in cave roosts on Isla Colon and Isla Bastimentos, Bocas del Toro Province, Panama.

Join us to reduce the threat of global climate change

Global climate change is arguably the most serious environmental threat faced today. At the Smithsonian Tropical Research Institute we have a number of scientists and research programs that address different aspects of this issue—from science to policy to raising awareness of decision makers.

One of the biggest contributions to this threat is the rise of carbon dioxide in the atmosphere. Every time we turn on a light, air conditioner, or fan, every time we drive our cars, and every time we clear tropical forest for construction we contribute to the release of carbon dioxide into the atmosphere.

As a leading scientific research institute, we feel we should also be leaders in setting examples of how to reduce and mitigate the threat posed by global climate change. We are therefore working to implement policies to reduce our institutional energy consumption as well as encourage the individual members of the STRI community to seek ways to reduce our individual carbon footprints on the environment.

At the same time, we are both protecting forests from destruction and planting trees to help take out and sequester carbon from the atmosphere. We are striving to become "carbon neutral".

The PRORENA project is a native species reforestation project that seeks strategies which are socially, economically, and ecologically sustainable for land restoration and reforestation across Panama. Research on the basic ecology of a group of native species allows us to design complex reforestation projects for multiple objectives.

In collaboration with ANAM and the ACP, we are reforesting 60 hectares within the boundaries of Soberania National Park with the goal of eliminating canal grass and replacing it with a structurally complex and biologically diverse forest. Treatments are also designed to sequester vast amounts of carbon and thus, in our own small way, contribute to reducing the threat of global climate change.

Come join us on Saturday, July 11, for a day of tree planting with your family to help address climate change and restore part of one of Panama's flagship National Parks. To make a reservation with your family, please contact Jeanette Egger at 212-8235.

By Jeff Hall

El cambio en el clima global es sin duda la amenaza ambiental más seria que enfrentamos hoy día. En STRI, hay varios científicos y programas de investigación que estudian los diferentes aspectos de este asunto—desde ciencia hasta políticas para aumentar la conciencia de los tomadores de decisiones.

Una de las contribuciones más grandes de esta amenaza es el aumento de dióxido de carbono en la atmósfera. Cada vez que prendemos una luz, el aire acondicionado o un abanico, cada vez que conducimos nuestros carros, y cada vez que deforestamos al bosque tropical para la construcción estamos contribuyendo a liberar dióxido de carbono en la atmósfera.

Al ser un instituto líder en las ciencias, sentimos que también debemos ser líderes en dar ejemplo sobre cómo reducir y mitigar la amenaza que significa el cambio climático global. Por ello, estamos trabajando para

poner en práctica políticas para reducir nuestro consumo institucional de energía, así como promover a la comunidad de STRI, como individuos para busquen formas de reducir nuestra huella de carbono en el ambiente. Al mismo tiempo que protegemos los bosques de la destrucción, plantamos árboles que ayudan a secuestrar el carbono de la atmósfera. Estamos luchando para ser neutrales en cuanto al carbono.

El proyecto de PRORENA es un proyecto de reforestación con especies nativas cuyo objetivo es lograr estrategias sociales, económicas y ecológicamente sostenibles para la restauración y reforestación a través de Panamá. Las investigaciones sobre ecología básica de un grupo de especies nativas nos permiten diseñar proyectos de reforestación complejos con objetivos múltiples.



More arrivals

Alla Shnayderman, Northeastern University, to study parasites, pathogens and the breeding strategies of social insects, in Gamboa.

Sebastian Haring, Leiden University, the Netherlands, to conduct studies of figs and fig-associated organisms, on BCI.

Peter Wilf, Pennsylvania State University, to carry out the project: "Does insect damage diversity correlate with insect diversity? A pilot study to calibrate the fossil record of insect damage and insect diversity from deep time to the present," at the CTPA, Ancon.

Departures

Marc Seid to Palo Alto, California, on a short vacation.

Anthony Coates to Cincinnati, Ohio, to attend the 2009 North American Paleontological Convention, and to Washington DC, to meet with STRI and Latino Center officers.

New publications

Barbosa, Flavia. 2009. "Cryptic female choice by female control of oviposition timing in a soldier fly." *Behavioral Biology* Online: June 17.

Biani, Natalia B., Mueller, Ulrich G., and Wcislo, William T. 2009. "Cleaner mites: sanitary mutualism in the miniature ecosystem of Neotropical bee nests." *American Naturalist* 173(6): 841-847.

En colaboración con ANAM y la ACP, estamos reforestando 60 hectáreas dentro de los límites del Parque Nacional Soberanía con el propósito de eliminar la paja canalera y reemplazarla con un bosque de estructura compleja y biológicamente diverso. Los tratamientos también han sido diseñados para secuestrar grandes cantidades de carbono, y así contribuir con nuestro

granito de arena, a reducir la amenaza del cambio climático global.

Acompañenos el sábado 11 de julio para un día de siembra con su familia que ayude con el cambio climático y restaure parte de uno de los parques nacionales insignia de Panamá. Para reservar cupo, contacte a Jeanette Egger al 212-8235



Material testing at Santa Cruz, Gamboa

Milton García, Aurelio Virgo, Klaus Winter, Fernando Pascal, STRI, and Ron Leu, supervisor from the company that supplied an ETFE chamber for a pilot study at Santa Cruz in Gamboa (see page 4).

Milton García, Aurelio Virgo, Klaus Winter, Fernando Pascal, STRI, y Ron Leu, supervisor de la compañía que proporcionó una cámara ETFE para un estudio piloto en Santa Cruz, Gamboa (vea página 4).



Smithsonian Tropical Research Institute

La Autoridad Nacional del Ambiente y El Instituto Smithsonian de Investigaciones Tropicales

Tienen el agrado de invitarle a la presentación del Plan de Manejo del Parque Nacional Coiba

Fecha: 23 de junio de 2009
Hora: 9:00 a.m. a 11:00 a.m.
Lugar: Instituto Smithsonian de Investigaciones Tropicales
Salón: Auditorio del Centro Earl S. Tupper

More publications

Eerhard, William G. 2009. "Postcopulatory sexual selection: Darwin's omission and its consequences." *Proceedings of the National Academy of Sciences* 106: 10025-10032.

Gowaty, Patricia Adair and Hubbell, Stephen P. 2009. "Reproductive decisions under ecological constraints: It's about time." *Proceedings of the National Academy of Sciences Online*: June 15.

Pyle, Elizabeth Hammond, Santoni, Gregory W., Nascimento, Henrique E. M., Hutyrá, Lucy R., Vieira, Simone, Curran, Daniel J., van Haren, Joost, Saleska, Scott R., Chow, V. Y., Carmago, Plinio B., Laurance, William F., and Wofsy, Steven C. 2008. "Dynamics of carbon, biomass, and structure in two Amazonian forests." *Journal of Geophysical Research-Biogeosciences* 113: G00B08-G00B08.

Vargas-Soto, J., Andrade, Jose Luis, and Winter, Klaus. 2009. "Carbon isotope composition and mode of photosynthesis in *Clusia* species from Mexico." *Photosynthetica* 47(1): 33-40.

STRI in the news

"The wonders of after sex" by Karl Zimer. 2009. *Science Origins*: June 16. sciencemag.org/origins

Panamania! A visit to the Smithsonian Tropical Research Institute. 2009. *Scientific American*: June 17.

Inflated pillows as tools for climate change research

Story: Klaus Winter
Edited by M Alvarado
& ML Calderon
Photo: MA Guerra

How does tropical vegetation respond to climate change? To find out, STRI plant physiologist Klaus Winter and collaborators are planning to grow plants in large, naturally illuminated enclosures in which temperature and carbon dioxide concentration can be experimentally manipulated.

A novel plastic, ETFE (ethylene tetrafluoroethylene), made into inflated cushions, may be a suitable building material to cover these enclosures. ETFE is 1% the weight of glass, transmits more light and dirt slides off its nonstick surface.

Several innovative buildings around the non-tropical world (Bronx Zoo, Eden Project Biomes, Beijing Olympic Aquatics Center) have used this new wonder polymer.

But how will it perform under the harsh humid tropical conditions of Panama? A small, recently installed prototype chamber in Gamboa will show. "If this works," says Winter, "STRI could become a place with some absolutely amazing and unique infrastructure for sophisticated experimental climate change research."

¿Cómo responde la vegetación tropical al cambio climático? Para averiguarlo, el fisiólogo vegetal de STRI, Klaus Winter y colaboradores planean cultivar plantas en grandes encierros iluminados naturalmente, donde la temperatura y la concentración de dióxido de carbono se puedan manipular experimentalmente.

Un plástico novedoso ETFE (etileno tetrafluoroetileno),

fabricado en forma de cojines inflados, puede ser un material de construcción apropiado para cubrir estos encierros. ETFE es solo 1% del peso del vidrio, transmite más luz, y la suciedad se resbala de su superficie no adhesiva. Varios edificios innovadores alrededor del mundo no-tropical (Zoológico del Bronx, Biomas del Proyecto Eden, el Centro Acuático Olímpico de Beijing) han usado este nuevo polímero.

Pero, ¿cuál será su desempeño bajo las condiciones extremas de la humedad tropical de Panamá? Una pequeña cámara prototipo recientemente instalada en Gamboa, nos dará la respuesta. "Si esto funciona", afirma Winter, "STRI podría convertirse en un lugar con algunas infraestructuras simplemente maravillosas y únicas para llevar a cabo sofisticados estudios experimentales sobre el cambio climático".