Smithsonian

100 years of science in Panama

Smithsonian Tropical Research Institute, Panamá | STRI news | www.stri.si.edu | September 16, 2011

Gamboa seminar

No Gamboa seminar scheduled for Monday, September 19.

Tupper seminar

Tuesday, September 20, 4pm seminar speaker will be Laurel Collins, Florida International University, Miami
Seagrass Foraminifera of Florida Bay, proxy for seagrass abundance through time

Bambi seminar

Thursday, September 22, Bambi seminar speaker will be Jordan R. Mayor, NSF and STRI postdoctoral fellow
Using nitrogen isotope ratios (15N:14N) in leaves and soils as metrics of tropical forest fertility and N-cycling pathways

Planing ahead

Wednesday, September 28, Centennial Series talk speaiker will be Helene Muller-Landau, STRI
Variación del clima en la Isla de Barro y sus efectos en el bosque

People make STRI

Director Eldredge Bermingham hosted a celebration to honor director emeritus Ira Rubinoff, who received the SI Joseph Henry Medal; STRI archaeologist Richard Cooke, who returned home after a long struggle with cancer; Egbert G. Leigh, Jr., who will retire next month after 40 years of service, and associate director for Finance and Administration Georgina de Alba, who retired after 34 four years at the Smithsonian, last week.


Bermingham & de Alba

Bermingham highlighted the contributions of each of these distinguished employees and revisited their careers and examples they set for the STRI community. Rubinoff commented on the progress of a book on his career at STRI. Cooke thanked the STRI community for their support during his most difficult times fighting cancer. Leigh remembered Martin Moynihan (1928-1996), the visionary founding director of STRI. Finally, de Alba thanked all staff who worked with her to advance the STRI mission.


Rubinoff

El director, Eldredge Bermingham, ofreció una celebración en honor del


Cooke


Leigh

Arrivals

Patricia Jones, University of Texas at Austin, to study predator foraging behavior, in Gamboa.

Victoria Flores, Brown University, to study predator foraging behavior, in Gamboa.

John Kilmer, University of Florida, to study Testing Gloger's Rule: Quantitative comparisons of color variation in insular and mainland avifauna populations.

Juan Sanchez, Rocío Acuña, Diana Carolina Ballesteros Contreras and Ivan Fernando Calixto Botía, Universidad de Los Andes, Colombia, to study ecological selection as promoter of speciation in a Caribbean gorgonian coral: A population genomics approach, at Bocas del Toro.

Brett Wolfe, University of Utah, to study characterizing divergent physiological responses to drought among tropical trees, on BCI and Gamboa.

Departures

Ben Turner to the University of Arizona, in Flagstaff, to give a seminar and sample soils from some of their sites, and to Oracle, Arizona, to attend the symposium "Stoichiometric flexibility in terrestrial ecosystems under global change."

David Roubik to Utah State University and Arizona State University to give lectures and meet with students and faculty members. Then to Washington, DC, to participate in a workshop on Comparative Genomics at the National Museum of Natural History and work on their bee collection.

director emérito de STRI, Ira Rubinoff, quien recibió la medalla del Smithsonian, Joseph Henry; el arqueólogo Richard Cooke, quien regresó a casa luego de una larga lucha contra el cáncer; Egbert G. Leigh, Jr., quien se jubiló luego de 40 años de servicio; y Georgina de Alba, quien se retiró luego de 34 años de servicio con el Smithsonian.

Bermingham hizo énfasis en las contribuciones de cada uno de estos distinguidos empleados, comentó sobre sus carreras y los ejemplos que representan para la comunidad de STRI.

Rubinoff comentó sobre el progreso de un libro que escribe sobre su carrera en STRI. Cooke agradeció el apoyo de la comunidad de STRI durante los momentos más difíciles de su lucha contra el cáncer. Leigh recordó a Martin Moynihan (1928-1996) como un visionario director fundador de STRI. Finalmente, de Alba agradeció a todos los miembros del personal que trabajaron con ella para llevar adelante la misión de STRI.

Recent arrival

Pamela Belding has joined the Advancement Team staff at the STRI Director´s Office on the 6th floor of the Tupper building, effective July 15. She is serving as creative director of the content team to help establish the new brand for STRI and to produce video and design for the new website to be launched in January 2012.

Belding holds a bachelor´s degree in Fine Arts from the Minneapolis College of Art and Design, and a master´s degree in Fine Arts in film from the California Institute of Arts, and has many years experience in print, video, and web media. She is also a fine artist and comes to STRI most recently from Minnesota, USA, where her two grown sons live.

Pamela Belding se unió al personal del "Advancement Team" en la Oficina del Director en el sexto piso de los Laboratorios del Tupper, a partir del 15 de julio. Funge como directora creativa del equipo de contenido para ayudar a establecer la nueva marca para STRI y producir video y diseño para la nueva página de web que se lanzará en enero de 2012.

Belding tiene una licenciatura en Artes de Minneapolis College of Art and Design y una maestría en Artes con énfasis en cine de California Institute of Arts, y tiene muchos años de experiencia en impresiones, video y medios de web. También es artista y viene a STRI desde Minnesota donde viven sus dos hijos ya adultos.

Departures

Haris Lessios to Washington DC, to attend the meeting of Life and Cosmos Grand Challenge and to the Committee meeting for judging Next Generation Sequence small grant proposals.

Steve Paton to Bodega Bay and Santa Barbara, CA, to participate in the 2011 Annual Meeting of the Organization of Biological Field Stations and in the Environmental Information Management Conference and Data ONE Implementation Workshop.

Joe Wright to Washington DC, to participate in EEO training and consult with colleagues.

Rachel Collin to North Charleston, SC, to participate at a meeting of the Society of Integrative and Comparative Biology.

STRI in the news

"Personaje: Estudiosos de los insectos del trópico", by María del Pilar Méndez" 2011. Revista Ellas September 16 (Supplement to *La Prensa*): 29-31.

"Arboles en Panamá ofrecen respuestas." 2011. La Prensa (viernes 16 de septiembre): 12B.

"Panama Research Institute dedicated to Earth´s ecosystem," by Zulima Palacio. *Lincoln Tribune.com*: September 13 at: http://lincolntribune.com/?p=19789

"UF study names new ancient crocodile relative from the land of Titanoboa, by Alex Hastings. 2011. *EurekAlert!:* September 14.

New publications

Desjardin, Dennis E., Peay, Kabir G., and Bruns, Thomas D. 2011. "Spongiforma squarepantsii, a new species of gasteroid bolete from Borneo." Mycologia 103(5): 1119-1123. 10.3852/10-433

Hastings, Alexander K., Bloch, Jonathan I., and Jaramillo, Carlos A. 2011. "A new longirostrine dyrosaurid (Crocodylomorpha, Mesoeucrocodylia) from the Paleocene of north-eastern Colombia: biogeographic and behavioural implications for New-World Dyrosauridae." *Palaeontology* 54(5): 1095-1116.

Luiz, Osmar J., Madin, Joshua S., Robertson, D. Ross, Rocha, Luiz A., Wirtz, Peter, and Floeter, Sergio R. 2011. "Ecological traits influencing range expansion across large oceanic dispersal barriers: insights from tropical Atlantic reef fishes." *Proceedings of the Royal Society B: Biological Sciences* doi:10.1098/rspb.2011.1525

Saltonstall, Kristin. 2011. "Remnant native *Phragmites australis*; maintains genetic diversity despite multiple threats." *Conservation Genetics* 12(4): 1027-1033.

Schad, J., Dechmann, Dina K.N., Voigt, Christian C., and Sommer, Simone. 2011. "MHC class II DRB diversity, selection pattern and population structure in a neotropical bat species, *Noctilio albiventris*." *Heredity* 107(2): 115-126.

Zotz, Gerhard and Bader, Maaike Y. 2011. "Sampling vascular epiphyte diversity - Species richness and community structure." *Ecotropica* (1): 103-112.

Ancient crocodile relative from the land of Titanoboa

In a new study published by *Palaeontology* (September 15), Alexander Hastings and Jonathan Bloch from the University of Florida, and STRI´s Carlos Jaramillo, describe a new 20-foot extinct species discovered in the same Colombian coal mine with Titanoboa, the world's largest snake. The findings help better understand the diversity of animals that occupied the oldest known rainforest ecosystem, which had higher temperatures than today, and could be useful for understanding the impacts of a warmer climate in the future.

The 60-million-year-old freshwater relative to modern crocodiles is the first known land animal from the Paleocene New World tropics specialized for eating fish, meaning it competed with Titanoboa for food. But the giant snake could also have consumed its competition, according to the study.

The new species is a dyrosaurid, commonly believed to be primarily ocean-dwelling, coastal reptiles. The new adult specimens challenge previous theories that the animals only would only have entered freshwater environments as babies before returning to sea.

The species is the second ancient crocodyliform found in the Cerrejon mine of northern Colombia, one of the world's largest open-pit coal mines. The excavations were led by study co-authors Jonathan Bloch, Florida Museum associate curator of vertebrate paleontology, and paleobotanist Carlos Jaramillo of the Smithsonian Tropical Research Institute.

En un estudio nuevo publicado por *Palaeontology* el 15 de septiembre, Alexander Hastings and Jonathan Bloch, de la Universidad de Florida, y Carlos Jaramillo, de STRI, describen una nueva especie de 20 pies de largo en la misma mina de carbón en Colombia donde hallaron de la Titanoboa, la culebra más grande del mundo. Este hallazgo ayuda a entender mejor la diversidad de animales que ocuparon el ecosistema del bosque tropical más viejo que se conoce, con temperaturas más altas que en la actualidad, lo que nos ayuda a entender mejor el impacto de climas más cálidos en el futuro.

Este especimen de 60 millones de años es pariente de los cocodrilos modernos el primer animal terrestre que se conoce de los trópicos del Nuevo Mundo en el Paleoceno. Se especializaba en comer peces lo que significa que competía por alimentos con la Titanoboa. Pero de acuerdo a este estudio, la gran culebra también pudo haberse comido a su competencia.

La nueva especie es un dirosaúrido, el cual se creía comunmente que eran reptiles costeros que vivían en el océano. Los especímenes del nuevo adulto ponen a prueba teorías previas de que antes de regresar al mar, los animales solo entraban a ambientes de agua dulce cuando eran bebés.

La especie es el segundo cocodriloforme antiguo que se ha encontrado en la mina de Cerrejón al norte de Colombia, una de las minas abiertas más grandes del mundo. Las excavaciones fueron lideradas por Bloch y Jaramillo.

What is the genetic and molecular basis of tree leaf-endophyte symbioses?

Smithsonian Tropical Research Institute, Septemnber 16, 2011

Story:
Allen Herre and Luis Mejía
Edited by M Alvarado and ML Calderón
Photo: MA Guerra

Endophytes are highly diverse microbial symbionts (generally fungi and bacteria) that colonize a host plant's internal tissues. Fungal endophytes are found in all plants surveyed and they produce few, if any, noticeable symptoms in their healthy host. In fact, endophytes often benefit their hosts by protecting them against abiotic and biotic stresses.

Currently, it is not known what physiological, genetic, and molecular mechanisms differentiate endophytes from pathogens in their initial infection, establishment, colonization, and ultimate effects on hosts.

Research by Allen Herre and Luis Mejía (in the photo) focuses on the chocolate tree *Theobroma cacao*, a tropical commodity crop of ecological importance, and its associated endophytes and pathogens. They are implementing high throughput genomic tools (i.e. microarrays developed by collaborators in the Penn State working group for the chocolate tree *T. cacao*), in order to determine the effects of fungal endophyte colonization on their host's genetic and phenotypic expression, and identify the genetic mechanisms that differentiate the beneficial interactions of plants and endophytes from the detrimental interactions between plants and pathogens.

Combining inoculation experiments with these newer genetic techniques, Herre and Mejía have identified substantial differences in cacao gene expression profiles in response to infection by *Colletotrichum tropicale*, the dominant, beneficial foliar fungal endophyte of cacao, and *Phytophthora palmivora,* an important pathogen of this crop.

Further *C. tropicale* differentially regulate a suite of host genes including some related to defense that may help explain why some plants colonized by endophytes can remain asymptomatic and more resistant to damage by pathogens than endophyte-free plants. Both scientists believe that understanding the mechanisms of endophyte effects on their hosts will allow their effective use as natural biocontrol agents of pathogens.

Las endófitas son simbiontes microbianos altamente diversos (generalmente hongos y bacterias) que colonizan los tejidos internos de la planta hospedera. Los hongos endófitos están presentes en todas las plantas estudiadas y producen pocos o ningún síntoma en hospederas saludables. De hecho, las endófitas a menudo benefician a sus hospederas al protegerlas de estreses abióticos y bióticos.

Actualmente, no se sabe cuáles son los mecanismos fisiológicos, genéticos y moleculares que diferencian a las endófitas de los patógenos en cuanto a su infección inicial, establecimiento, colonización y efectos finales sobre sus hospederas.

Las investigaciones realizadas por Allen Herre y Luis Mejía (en la foto) se enfocan en el árbol de cacao *Theobroma cacao*, un cultivo comercial tropical de importancia ecológica, y sus endófitas y patógenos asociados. Están utilizando herramientas genómicas de alto rendimiento (ej. microarreglos desarrollados por colaboradores de Penn State del grupo de trabajo sobre el árbol *T. cacao*), a fin de determinar los efectos de la colonización por hongos endófitos sobre la expresión genética y fenotípica de sus hospederas, e identificar los mecanismos genéticos que diferencian las interacciones beneficiosas entre plantas y endófitas, de las interacciones perjudiciales entre plantas y patógenos.

Al combinar experimentos de inoculación con técnicas recientes, Herre y Mejía han identificado diferencias importantes entre los perfiles de expresión genética del cacao en respuesta a la infección por *Colletotrichum* tropicale, el dominante y beneficioso hongo endófito foliar del cacao, y *Phytophthora palmivora*, un importante patógeno de este cultivo.

Otras cepas de *C. tropicale* regulan en forma diferencial un conjunto de genes hospederos incluyendo algunos relacionados con la defensa, lo cual podría explicar por qué algunas plantas colonizadas por endófitas permanecen asintomáticas y más resistentes a daños por patógenos que las plantas libres de endófitas. Ambos científicos creen que comprender los mecanismos de los efectos de las endófitas sobre sus hospederas facilitará su uso efectivo como biocontroladores naturales de patógenos.