



# STRINEWS

MAY 18, 2012



Photo by Marcos Guerra

## Why do different butterfly species have similar wing patterns?

The Heliconius Genome Consortium\* pooled funds to sequence the genome of the butterfly genus *Heliconius*, published in *Nature* this week. Panama's *Heliconius melpomene* is a model for understanding how the stunning diversity of wing color patterns in tropical butterflies evolved. "What we discovered is that one butterfly species can gain its protective colour pattern genes ready-made from a different species by hybridizing with it," said Kanchon Dasmahapatra, former STRI fellow.

An analysis by Adriana Briscoe at the University of California showed that *Heliconius* has an even greater array of genes involved in chemical communication than moths, which depend on chemical signals for finding mates and host plants.

The study heralds a new era in genome biology and an important step in the Smithsonian's goal to understand and sustain a biodiverse planet. "Assembling a genome from scratch is still hard work: think Humpy-Dumpty," said STRI's Owen McMillan, "but it is getting easy, inexpensive, and is

transforming how we do science. A reference genome opens up new research possibilities and reveals previously unimagined connections."

### ¿Por qué distintas especies de mariposas tienen patrones similares en sus alas?

El Heliconius Genome Consortium\* recogió fondos para secuenciar el genoma de la mariposa *Heliconius* publicado esta semana en la revista *Nature*. La *Heliconius melpomene* de Panamá es un modelo para comprender cómo evolucionaron los asombrosos y coloridos patrones de las alas de las mariposas tropicales. "Lo que hemos descubierto es que una especie de mariposa puede obtener genes de patrones de color protector ya listos de diferentes especies por cruzarse," comenta Kanchon Dasmahapatra, antiguo becario del Smithsonian en Panamá.

Un análisis realizado por Adriana Briscoe de la University of California demostró que la *Heliconius* tiene una mayor

colección de genes involucrados en la comunicación química que las polillas, las cuales dependen de señales químicas para encontrar pareja y plantas hospederas.

El estudio señala el comienzo de una nueva era en la biología de genomas y un paso importante en la meta del Smithsonian de comprender y sostener un planeta con biodiversidad. "Armar un genoma desde el principio es aun un trabajo arduo. Imagínese a Humpy-Dumpty," comenta Owen McMillan del Smithsonian en Panamá, "pero se está haciendo más fácil, menos costoso y está transformando la manera en que hacemos ciencia. Un genoma de referencia nos abre nuevas oportunidades de investigación y nos revela conexiones previas inimaginadas."

\*STRI, Panama: W. Owen McMillan; University of Cambridge, UK: Chris Jiggins; Boston University, USA: Sean Mullen; Harvard University, USA: Marcus Kronforst; University of California at Irvine, USA: Robert Reed, Adriana Briscoe; Muséum National d'Histoire Naturelle, Paris, France: Mathieu Joron; University of Edinburgh, UK: Mark Blaxter; University College London, UK, and Harvard University, USA: James Mallet; University of Exeter, UK: Richard French-Constant

The Heliconius Genome Consortium. Butterfly genome reveals promiscuous exchange of mimicry adaptations among species. 2012. *Nature*. Doi:10.1038/nature11041. Published online 16 May.

◀ Wing color patterns indicate that *Heliconius* butterflies taste bad.  
Los patrones de color en las alas de la mariposa *Heliconius* indican que ésta sabe mal.

### SEMINARS

#### GAMBOA SEMINAR

Mon., May 21, 4 pm  
Teague O'Mara  
STRI & Arizona State University  
Gamboa schoolhouse  
Ecological risk aversion and the development of ring-tailed lemur feeding ecology

#### BEHAVIOR DISCUSSION GROUP

Tues., May 22, 2 pm  
Peter R. Marting  
PhD Student  
Arizona State University  
Tupper Large Meeting Room  
Testing for collective personality in Azteca ant colonies

#### TUPPER SEMINAR

Tues., May 22, 4 pm  
Mike Kaspari  
University of Oklahoma  
Tupper auditorium  
The ions of life--why sodium and potassium matter in tropical forest ecology

### ARRIVALS

Marian Shaffer  
University of Wisconsin-Green Bay  
Field Course - INRC Internship Program - 2012  
Bocas del Toro, Naos Marine Lab

#### Ana Magdalena Hurtado

Arizona State University  
Uso de antibioticos y comportamiento por hormigas cultivadoras de hongos para evitar enfermedades infecciosas y parasitoides

## ARRIVALS

### Matthew Fuxjager

University of California - Los Angeles  
Hormonal and neural control of a sexually dimorphic behavior  
Naos Marine Lab

### Layla Freeborn

Tulane University  
Phylogeography of Bocas del Toro  
Bocas del Toro

### Michael Weiser, Jackson Helms, Jelena Bujan, Michael Kaspari

University of Oklahoma  
Experimental MacroEcology-the kinetics of biodiversity in soil microbes and invertebrates  
Barro Colorado Island (BCI)

### Julia Berkey, Daniel Lenger

Tulane University  
Selection and the rapid evolution of morphological variation among Strawberry poison-dart frogs of the Bocas del Toro archipelago  
Bocas del Toro

### Sebastian Gottfried

TU Dortmund  
Evolutionary ecology of fungus growing ants  
Barro Colorado Island (BCI)

### Kirsten Nicholson,

### Sarah Burton,

### John Phillips

Central Michigan University

### David Laurencio

Auburn University  
Systematics and biogeography of mainland *Norops* clade  
*Anolis* lizards  
Bocas del Toro, Fortuna, Barro Colorado Island (BCI), Gamboa

### Erik Lindquist

Messiah College

### Molly Bletz

James Madison University  
Investigations of the cutaneous microbial community of *Isthmohyla picadoi*: Determination of the presence of the anti-Bd bacteria

### Karen Lips

University of Maryland  
Evolution of a amphibian MHC genes after an infectious disease outbreak “



From left to right | De der. a izq.: Marco Neira, Néstor Sosa, Luke Alphey Fred Gould, Jennifer Kuzma y Carlos Gálvez.

## Open Forum: Transgenic Mosquitoes

The Gorgas Memorial Institute of Tropical & Preventative Medicine, the University of Panama and the Smithsonian organized the forum: “Transgenic Mosquitoes: Where are we in Panama?” on May 16. The aim was to discuss the technology needed to produce transgenic insects and their use to control dengue, their applicability and the scientific studies needed to guarantee the efficacy of the method against this disease.

Dengue, a serious and incurable disease, is produced by a virus transmitted by female mosquitoes, *Aedes aegypti*. In Latin America and the Caribbean dengue incidence and severity is rapidly increasing. In 2011 Panama counted 3882 cases of dengue resulting in 16 deaths with costly ramifications for the health and economic sectors.

During the forum, scientists presented advances in technologies under study for more than 10 years to create transgenic mosquitoes incapable of transmitting dengue virus, as well as creating male mosquitoes that mate with the females resulting in larvae that cannot reproduce.

## Foro Abierto: Mosquitos Transgénicos

El Instituto Conmemorativo Gorgas de Estudios de la Salud, la Universidad de Panamá y el Smithsonian celebraron el Foro Abierto: “Mosquitos Transgénicos: ¿Dónde estamos en Panamá?” el 16 de mayo. El objetivo fue discutir la tecnología de insectos transgénicos para controlar el dengue, su aplicabilidad y los estudios científicos necesarios para garantizar su eficiencia contra esta enfermedad.

El dengue, una enfermedad grave para la cual no existe un tratamiento específico es producida por un virus que se transmite por la hembra del mosquito *Aedes aegypti*. En América Latina y el Caribe, la incidencia y la gravedad de la enfermedad están aumentando rápidamente. En 2011 en Panamá se contabilizaron 3882 casos de dengue que resultaron en 16 muertes y costosas implicaciones en los sectores salud y económico.

Durante el foro, científicos destacados presentaron los últimos avances de las tecnologías estudiadas por más de 10 años que buscan crear mosquitos transgénicos incapaces de transmitir el virus del dengue, así como también crear machos que al aparearse con hembras hacen que estas produzcan larvas que mueren antes de desarrollarse.

## ARRIVALS

### Yonatan Munk

University of Washington  
Dana Frederick, Samantha Nicholls  
University of Arkansas  
Ecology and behavior of arboreal arthropods  
Barro Colorado Island (BCI)

### Frederick Hanselmann

Texas State University  
The lost ships of Henry Morgan project  
Galeta Station

### Jordan Bemmels, Na Wei

University of Michigan  
Population genetic structure and phylogeography of widespread tropical forest trees  
Barro Colorado Island (BCI)

### Andrew Bretscher,

### Casey Krause

Frostburg State University  
Influence of resource abundance on intra- and inter-specific interactions between the Echimyid Rodent *Proechimys semispinosus* and *Hoplomys gymnurus*  
Gamboa

### Jesse Delia

Boston University  
Parent-embryo interactions in neotropical glassfrogs (Centrolenidae) - Amendment  
Gamboa

### Adam Kay

University of St. Thomas  
Toward a stoichiometric theory of ant ecology--from colony performance to community composition  
Barro Colorado Island (BCI)

### Matthew Starr

University of Louisiana at Lafayette  
“NSF IOS-1019727 - Biased evolutionary transitions in mode of development: Can differences in morphology and digestive function be linked to evolvability of gastropod development  
Naos Marine Lab

## ARRIVALS

### Gladys Gonzalez Dufau

Instituto de Investigacion Agropecuaria de Panama MMUL - Molecular Multiuser Laboratory Naos Marine Lab

### Robert Dudley

University of California - Berkeley  
Ecophysiology of neotropical butterfly migrations  
Barro Colorado Island (BCI)

## DEPARTURES

### Harilaos Lessios

To St. Petersburg, Florida  
To join research cruise organized by the University of Florida, Florida Institute of Technology.

### Rachel Collin

To Bonaire  
To attend the Association of Marine Labs of the Caribbean Board meeting. Collin is currently the Director.

## NEW PUBLICATIONS

Ackerman, James D. and Roubik, David Ward. 2012. Can extinction risk help explain plant-pollinator specificity among euglossine bee pollinated plants? *Oikos*, doi:DOI:10.1111/j.1600-0706.2011.20193

Ayala, R. C., Bayona, G., Cardona, A., Ojeda, C., Montenegro, O. C., Montes, C., Valencia, V. and Jaramillo, C. 2012. The paleogene synorogenic succession in the northwestern Maracaibo block: Tracking intraplate uplifts and changes in sediment delivery systems. *Journal of South American Earth Sciences*, doi:10.1016/j.jsames.2012.04.005

Becker, Nina I., Encarnação, Jorge A., Kalko, Elisabeth K. V. and Tschapka, Marco. 2012. The effects of reproductive state on digestive efficiency in three sympatric bat species of the same guild. *Comparative Biochemistry and Physiology - Part A: Molecular & Integrative Physiology*, doi:10.1016/j.cbpa.2012.04.021



Photo courtesy of Chris Freeman

## Chris Freeman Receives Research Award

Chris Freeman, former fellow at STRI's Bocas del Toro Research Station, was honored for his research on the mutually beneficial relationships between microorganisms and the reef sponges they live in.

Freeman won the Dean's Award of the College of Arts and Sciences at the University of Alabama at Birmingham, an annual award for distinguished research.

A PhD candidate at UAB, Freeman attended the sponge taxonomy and ecology course at Bocas in 2006 and returned as a STRI fellow in 2010, when he completed most of the fieldwork for his dissertation.

He already has a postdoctoral fellowship in hand at the Smithsonian Marine Station at Fort Pierce, Florida. Beginning in January, he'll study the human impact on these symbiotic relationships in the Caribbean.



Photo courtesy of Chris Freeman

"My experiences at the Bocas Station and with the Smithsonian have truly been instrumental in my development as a scientist over the last six years," says Freeman.

"Mi experiencia en la Estación en Bocas y con el Smithsonian realmente fue decisiva en mi desarrollo como científico en estos seis años," comenta Freeman.

## Chris Freeman recibe premio por investigación

Chris Freeman, antiguo becario en la Estación de Investigación del Smithsonian en Bocas del Toro, Panamá fue distinguido por su investigación referente a las relaciones mutualistas beneficiosas entre los microorganismos y las esponjas de arrecife en las que éstos habitan.

Freeman ganó el Dean's Award of the College of Arts and Sciences en la University of Alabama (UAB por sus siglas en inglés) en Birmingham, EEUU, premio anual otorgado por investigación ejemplar.

Como candidato a doctorado de la UAB, Freeman participó en los cursos de taxonomía y ecología en Bocas en el 2006 y volvió al Smithsonian como becario en el 2010 al terminar la mayor parte de su trabajo de campo para su tesis.

Él ya cuenta con una beca postdoctoral en la Smithsonian Marine Station en Florida, EEUU. A partir de enero, estudiará el impacto humano en estas relaciones simbióticas en el Caribe.

## NEW PUBLICATIONS

Beckman, Noelle G., Neuhauser, Claudia and Muller-Landau, Helene C. 2012. The interacting effects of clumped seed dispersal and distance- and density-dependent mortality on seedling recruitment patterns. *Journal of Ecology*, doi:10.1111/j.1365-2745.2012.01978.x

Collin, R. 2012. Nontraditional Life-History Choices: What Can "Intermediates" Tell Us about Evolutionary Transitions between Modes of Invertebrate Development? *Integrative and Comparative Biology* doi: 10.1093/icb/ics065

Díaz, Giovanni J., Rico, Jhon, Bayona, German, Montes, Camilo, Rosero, Alexis and Sierra, Daniel. 2012. Analysis of curved folds and fault/fold terminations in the southern Upper Magdalena Valley of Colombia. *Journal of South American Earth Sciences*, doi:10.1016/j.jsames.2012.04.006

Heckadon-Moreno, Stanley. 2012. Armagedon Hartmann: los campesinos chiricanos y la Guardia, 1968. *Epocas*, 27(4): 10-11.

Hirsch, B.T., R. Kays & P.A. Jansen 2012. A telemetric thread tag for tracking seed dispersal by scatterhoarding rodents. *Plant Ecology*. doi: 10.1007/s11258-012-0054-0.

Jung, Kirsten, Kaiser, Sonja, Boehm, Stefan, Nieschulze, Jens and Kalko, Elisabeth K. V. 2012. Moving in three dimensions: effects of structural complexity on occurrence and activity of insectivorous bats in managed forest stands. *Journal of Applied Ecology*, 49(2): 523-531. doi:10.1111/j.1365-2664.2012.02116.x

Rosindell, J., P.A. Jansen, R.S. Etienne. 2012. Age structure in neutral theory resolves inconsistencies related to reproductive size threshold. *Journal of Plant Ecology* 5: 64-71. doi: 10.1093/jpe/rtr034

## May Dixon

At 5 pm in Gamboa, not far from the Panama Canal, the playground is crowded with kids. Next door, May Dixon is getting ready to mist-net bats.

A recent graduate of Carlton College, May came to Gamboa as field technician for staff scientist, Rachel Page. “I already had rabies shots,” said the self-described wild woman, who’s caught hundreds of bats in the month that she’s been here. “In New England where I’m from there are only two species of bats but here in Panama there are around 120 species.”

At the forest’s edge, May sets up what looks like a badminton net made with very fine, black nylon thread. Only an hour after dark, a bat that she has never seen before summersaults into the net. “It’s a boy. It’s probably an insect eater that uses passive listening because it has long ears. Its broad wings mean that it’s probably good at maneuvering.”

*Micronycteris hirsuta*, the Hairy Big-Eared Bat, with its mohawk-like tuft of hair, is not the coolest bat she’s caught so far. That was a Great Woolly False Vampire on Barro Colorado Island! “It was a little bit terrifying.”

## May Dixon

En Gamboa, a las 5 de la tarde, no muy lejos del Canal de Panamá los niños juegan en el parque. Muy cerca May Dixon se prepara para atrapar murciélagos con redes de niebla.

May, recién graduada del Carlton College en Minnesota, EEUU, llegó a Gamboa como asistente de campo para Rachel Page, científica de planta del Smithsonian. “Ya me inyecté contra la rabia,” comenta May, que ha atrapado a cientos de murciélagos durante el mes que ha estado aquí. “En New England de donde vengo, sólo hay dos especies, pero en Panamá hay alrededor de 120 especies.”

A la orilla del bosque, May instala lo que parece una red de bádminton hecha de fino hilo de nylon negro. Una hora después del anochecer, cae en la red un murciélago que ella nunca había visto. “Es un macho. Probablemente se alimenta de insectos por medio de la escucha pasiva pues tiene orejas largas. Sus amplias alas significan que probablemente es bueno maniobrando.”

El *Micronycteris hirsuta*, murciélago peludo de grandes orejas y con un mechón de pelos estilo “mohawk” no es el murciélago más interesante que May haya atrapado. Ese fue un gran vampiro falso peludo en la isla Barro Colorado “Me aterró un poco.”

Photo by Pamela Beltrino

Questions/comments  
Preguntas/comentarios  
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May Dixon carefully untangles a bat captured in a mist net.

May Dixon desenreda cuidadosamente a un murciélago enredado en una red de niebla.