

## Tupper 4pm seminar

Tuesday, June 9, 4pm  
seminar speaker will be  
Greg Adler, University of  
Wisconsin at Oshkosh  
**Rodent engineers in  
tropical forest**

## BDG

The Behavior Discussion  
Group will meet on  
Tuesday, June 9 at 2pm  
with Janeene Touchton,  
Princeton University  
**Life after species loss:  
increased individual  
variation in spotted  
antbirds (*Hylophylax  
naevioides*)**

## Bambi seminar

Tuesday, June 11, Bambi  
seminar speaker will be  
Charles Darveau, University  
of Ottawa  
**Evolution of flight  
energetics in orchid bees**

## Special

Cantus Panamá invites the  
STRI community to attend to  
**A musical tribute to  
Elizabeth Leigh**  
On Saturday, June 13, at 7:30  
pm, Tupper Auditorium.  
For more information please  
contact saltonstallk@si.edu  
or davidlortie@hotmail.com

## Arrivals

Mónica Ramírez Carvalho  
and Felipe Villegas,  
Universidad de Antioquia, to  
work on the geological  
history of a Neotropical  
forest, at the CTPA.

Ricardo Cossio and Rebecca  
Acosta, University of  
Panama, to study deposition  
strategies by males of  
*Ranitomeya claudiae*, a poison  
frog on Bocas del Toro.



Smithsonian Tropical Research Institute, Panamá

[www.stri.org](http://www.stri.org)

June 5, 2009

## “Trading energy for safety”

*Bees extend legs to stay stable in winds”*

Together with Robert Dudley, STRI research associate from University of California, Berkeley, Stacey Combes, from Harvard, authored an article to be published by the *Proceedings of the National Academy of Sciences*, detailing how bees brace themselves against wind and turbulence by extending their sturdy hind legs while flying. Though safer, this approach comes at a steep cost, increasing aerodynamic drag and the power required for flight by roughly 30%, and cutting into the bees' flight performance.

The researchers studied wild orchid bees that fly at high speeds for tens of kilometers each day seeking food and other resources on BCI. Males of these species are especially motivated to collect aromatic scents in pouches on their oversized hind legs, which are then used in mating displays that attract females.

Using high-speed video, the scientists measured the bees' maximum flight speed as they were buffeted by varying levels of environmental turbulence. In every case, the bees displayed a side-to-side rolling motion at high flight speeds, negotiating the turbulence by extending their rear legs while in flight.

Little is known about how animals navigate windy

conditions and unpredictable airflows, since most studies of animal flight have taken place in simplified environments, such as in still air or perfect laminar flows. The new studies conducted by Combes and Dudley show that the effect of environmental turbulence on flight stability is an important and previously unrecognized determinant of flight performance (*Information taken from EurekaAlert.*)

Junto con Robert Dudley, investigador asociado a STRI de la Universidad de California en Berkeley, Stacey Combes, de Harvard, escribieron un artículo que publicará *Proceedings of the National Academy of Sciences* con detalles sobre cómo las abejas se protegen contra el viento y la turbulencia al extender sus fuertes patas posteriores mientras vuelan. Aunque es más segura, esta estrategia tiene un gran costo, al dificultar la aerodinámica y el poder necesario para volar en un 30%, lo que disminuye la capacidad de vuelo de las abejas.

Los investigadores estudiaron abejas de orquídeas que vuelan a gran velocidad por decenas de kilómetros todos los días en búsqueda de alimento y otros recursos en BCI. Los machos de estas especies están muy motivados en coleccionar esencias aromáticas en los receptáculos



de sus enormes patas traseras, para atraer a las hembras durante el cortejo.

Con videos de alta velocidad, los científicos midieron la velocidad máxima de las abejas mientras eran golpeadas en grados de turbulencia ambiental. En cada caso, las abejas demostraron un movimiento rotativo de lado a lado en altas velocidades, contrarrestando la turbulencia al extender sus patas traseras en pleno vuelo.

Poco se sabe sobre cómo navegan los animales con vientos y flujos de aire imposibles de predecir, ya que la mayoría de los estudios del vuelo de los animales se llevaban a cabo en ambientes simplificados, con aire estático o flujos perfectos de aire.

Los nuevos estudios de Combes y Dudley muestran que el efecto de la turbulencia ambiental es una variable importante en la estabilidad del vuelo de los animales, a la que no se había dado importancia previamente.

## More arrivals

Holly Memino, US, to join the project on female choice in Túngara frogs, in Gamboa.

Edward Hurme, Princeton University, to study the physiological trait patterns and their role in governing mobile animal competitive hierarchies, on BCI.

Kristine White, University of Southern Mississippi, to study the diversity and ecology of leucothoid amphipods in tunicate hosts of Panama, at Bocas.

Phoebe Barkan, University of Illinois Urbana-Champaign, to study elevation effects on the life history characteristics of tropical trees, on BCI.

Lukas Sekerka, University of South Bohemia, Czech Republic, to study the natural history of Panamanian Cassidine beetles.

Ian Macintyre, SI National Museum of Natural History, and research assistants Richard Aronson, Lauren Toth and Jenniffer Hobbs from the Florida Institute of Technology, to study climate change and mass mortality of corals on opposite sides of the Central American Isthmus, at Naos.

Jennifer Kerekes, University of California at Berkeley, to study the diversity and substrate specificity of saprotrophic fungi along a nutrient gradient in a tropical forest, and participate in the project "Toward a stoichiometric theory of ant ecology--from colony performance to community composition," on BCI.

## Oscar Puebla: first STRI-NEO Ph.D.

Oscar Puebla, STRI and McGill's Neotropical Environmental Option (NEO) Ph.D. candidate doing research at STRI and in Montreal, successfully defended his Ph.D. thesis "Molecular ecology and evolution in *Hypoplectrus* coral reef fishes" on May 19 in Montreal, becoming the first PhD in the McGill-STRI NEO program.

Puebla, from Switzerland, began studies at McGill in 2003 under the supervision of STRI director Eldredge Bermingham and the co-supervision of McGill's Frédéric Guichard. He received part of the funding for his studies from the Levinson and Astroff-Buckshon families through NEO. Altogether he spent 30 months in Panama and three years in Montreal, moving back and forth each year. Four chapters of his thesis had already published or accepted for publication at the time of his Ph.D. defense.

Puebla combined molecular population genetics, field monitoring, behavioral observation and computer simulations to study speciation, adaptive radiation and dispersal in coral reef fishes using communities of (*Hypoplectrus* spp) as a model system. His thesis illustrates the potential offered by the NEO program in combining the academic environment of McGill with STRI's expertise in the tropics.

Currently, the STRI-NEO program includes 30 master's candidates, six of which are from Latin America and 12 Ph.D. candidates, of which eight are from Latin America.

The photo above shows (background, from the left):



Dominique Roche, Oscar Puebla (McGill/STRI), Owen McMillan (North Carolina State University), and STRI's Biff Bermingham. In the foreground are Pablo Rico (Fisheries Department, Honduras), STRI's Edgardo Ochoa and Sandra Binning, (McGill), at Half Moon Cays, Honduras, June 2006, during an expedition on the *R/V Urraca*.

Oscar Puebla, candidato a doctorado de STRI y la Opción Ambiental Neotropical (NEO) de la Universidad de McGill quien hizo investigaciones en STRI y Montreal, defendió exitosamente su tesis de doctorado "Molecular ecology and evolution in *Hypoplectrus* coral reef fishes" [Evolución y ecología molecular en peces de arrecifes coralinos *Hypoplectrus* el 19 de mayo en Montreal, convirtiéndose en el primer doctorado del programa de NEO STRI-McGill.

Puebla, de Suiza, empezó sus estudios en McGill en 2003 bajo la supervisión de Eldredge Bermingham y la co-supervisión de Frédéric Guichard, de McGill. La familia Levinson y Astroff-Buckshon financiaron parcialmente sus estudios, a través de NEO. En total, Puebla pasó 30 meses en Panamá y tres años en Montreal, viajando entre ambos

puntos cada año. Cuatro capítulos de su tesis habían sido publicados o aceptados para publicación en la fecha de la defensa de la tesis.

Puebla combinó genética de poblaciones moleculares, monitoreo en el campo, observaciones de comportamiento y simulaciones computacionales para estudiar la especiación, dispersión y radiación por adaptación en peces de arrecifes coralinos usando poblaciones de *Hypoplectrus* spp. como sistema modelo. Su tesis ilustra el potencial que ofrece el programa NEO al combinar el ambiente académico de McGill con la experiencia de STRI en los trópicos.

La foto de arriba muestra (de pie desde la izquierda) a Dominique Roche, Oscar Puebla (McGill/STRI), Owen McMillan (North Carolina State University), y Biff Bermingham de STRI. En primer plano aparecen Pablo Rico (Departamento de Pesquerías de Honduras), Edgardo Ochoa de STRI y Sandra Binning, (McGill), en los Cayos de Media Luna, Honduras, en junio de 2006, durante una expedición a bordo del *R/V Urraca*.

## Departures

Mera McGrew, Vassar College, to examine the processes regulating coexistence in *Synalpheus* in a geographic context, on Bocas.

Tania Romero to Ecuador, to conduct soil sampling at the Yasuni 50-ha plot project in Lago Agrio.

William F. Laurance to Spain, to receive the 2008 BBVA Foundation Frontiers of Knowledge Award in Madrid, Spain. Also to give seminars at the University of Madrid.

## New publications

Combes, Stacey A. and Dudley, T. Robert K. 2009. "Turbulence-driven instabilities limit insect flight performance." *Proceedings of the National Academy of Sciences* 106(22): 9105-9108.

Ewers, Robert Mark, Scharlemann, Jorn P.W., Balmford, Andrew, and Green, Rhys E. 2009. "Do increases in agricultural yield spare land for nature?" *Global Change Biology* 15(7): 1716-1726.

Gluckman, Peter D., Hanson, Mark A., Bateson, Patrick, Beedle, Alan S., Law, Catherine M., Bhutta, Zulfiqar A., Anokhin, Konstantin V., Bougnères, Pierre, Chandak, Giriraj Ratan, Dasgupta, Partha, Smith, George Davey, Ellison, Peter T., Forrester, Terrence E., Gilbert, Scott F., Jablonka, Eva, Kaplan, Hillard, Prentice, Andrew M., Simpson, Stephen J., Uauy, Ricardo, and West-Eberhard, Mary Jane. 2009. "Towards a new developmental synthesis: adaptive developmental plasticity and human disease." *The Lancet* 373(9675): 1654-1657.

# Biofuels: The impact of oil palms on forests and climate

STRI's Environmental Leadership & Training Initiative (ELTI) and the Department of Biological Sciences, National University of Singapore, sponsored a joint conference from May 12-13 on Biofuels: The impact of oil palms on forests and climate.

The conference was structured around five panels, each addressing one of the five following questions:

— To what extent have tropical forests been converted or will be converted to expand oil palm production for bio-fuels?

— What factors determine the extent to which greenhouse-gas (GHG) emissions are reduced by using oil palm-derived bio-diesel? Are they better reduced through Reduced Emissions from Deforestation and Degradation (REDD)?

— What is the potential for second-generation biofuel feedstock, such as *Jatropha* and algae, to reduce the negative environmental impacts associated with oil palm?

— What are the prospects for certification schemes to reduce the environmental impact of oil palm cultivation?

— What additional steps can be taken to minimize the environmental impacts caused by the oil palm and the biofuel industry?

Each panel had two to four speakers, representing the palm-based biofuel industry, academic institutions, non-governmental conservation organizations (NGOs), government agencies, and certification entities.

A keynote address was delivered by STRI's William F. Laurance, while the opening remarks and closing synthesis were given by Javier Mateo-Vega, director of ELTI. The event was led by



David Neidel, training coordinator for the Asia program and Hazel Consunji, assistant training coordinator.

La Iniciativa para la Capacitación de Liderazgo Ambiental de STRI (ELTI, por sus siglas en inglés) y el Departamento de Ciencias Biológicas de la Universidad Nacional de Singapur llevaron a cabo una conferencia en conjunto del 12 al 13 de mayo sobre bio-combustibles: el impacto de la palma de aceite en el bosque y el clima.

La conferencia se estructuró alrededor de cinco paneles, cada uno dedicado a una de las siguientes cinco preguntas:

— ¿Hasta qué punto los bosques tropicales se han convertido o se convertirán para expandir la producción de la palma de aceite para producir bio-combustibles?

— ¿Qué factores determinan la extensión a la que se reducen las emisiones de gases de invernadero al usar bio-diesel derivado del aceite de palma? ¿Habrà una mayor reducción a través de Reducción de Emisiones por Deforestación y Degradación (REDD)?

— ¿Qué potencial hay para obtener materia prima para bio-combustibles de segunda

generación, como algas y el árbol de *Jatropha* y así reducir los impactos ambientales negativos asociados con la palma de aceite?

— ¿Cuáles son los prospectos de estrategias de certificación para reducir el impacto ambiental del cultivo de la palma de aceite?

— ¿Cuáles son los pasos adicionales que se pueden tomar para minimizar los impactos ambientales causados por la palma de aceite y la industria de los bio-combustibles?

Cada panel tuvo de dos a cuatro conferencistas quienes representaron a la industria de bio-combustibles de la palma de aceite, instituciones académicas, organizaciones para la conservación no gubernamentales, y entidades de certificación.

William F. Laurance, de STRI ofreció una conferencia magistral, mientras que los comentarios de apertura y clausura estuvieron a cargo de Javier Mateo-Vega, director de ELTI. El evento fue liderado por David Neidel, coordinador del Programa de Capacitación para Asia y Hazel Consunji coordinadora asistente del Programa.

## More publications

Holscher, Dirk, Dunker, Bianca, Harbusch, Marco, and Corre, Marife. 2009. "Fine root distribution in a lower montane rain forest of Panama." *Biotropica* 41(3): 312-318.

Mello, M.A.R., Kalko, E.K.V., and Silva, W.R. 2009. "Ambient temperature is more important than food availability in explaining reproductive timing of the bat *Sturmira lilium* (Mammalia: Chiroptera) in a montane Atlantic Forest." *Canadian Journal of Zoology-Revue Canadienne De Zoologie* 87(3): 239-245.

Winter, Klaus, Garcia, Milton, and Holtum, Joseph A.M. 2009. "Canopy CO2 exchange of two neotropical tree species exhibiting constitutive and facultative CAM photosynthesis, *Clusia rosea* and *Clusia cylindrica*." *Journal of Experimental Botany* Online: erp149

## STRI in the news

Rainforest is worth more standing, by Victoria Gill. 2009. BBC News: June 5. <http://news.bbc.co.uk/2/hi/science/nature/default.stm>

La biodiversidad en Panamá [Multimedia] by Jesús Martínez. 2009. Featuring William F. Laurance at: <http://www.laestrella.com.pa/especiales/2009/05/25/index.html>

"Initiative targets leaders with largest influence on landscapes, by Steve Kemper. 2009. *The Journal of the Yale School of Forestry and Environmental Studies*: Spring

"Temporary infidelity contributes to stability of old relationships" 2009. *RedOrbit*: June 1<sup>st</sup>.

## West-Eberhard: one of the most-read

The Editorial Board of the *Proceedings of the National Academy of Sciences* (USA) listed a 2005 paper by STRI scientist Mary Jane West-Eberhard on "Developmental plasticity and the origin of species differences" (*PNAS* 102:6543-6549) as one of the 30 *PNAS* papers most read online during the month of April, 2009. You can obtain the article from [calderom@si.edu](mailto:calderom@si.edu)

La revista *Proceedings of the National Academy of Sciences* (*PNAS*) de los Estados Unidos

listó un artículo de la científica de STRI, Mary Jane West-Eberhard, "Developmental plasticity and the origin of species differences" [Plasticidad en el desarrollo y el origen de las diferencias entre las especies] publicado por *PNAS* en 2005, (vol 102: 6543-6549), como uno de los 30 artículos de *PNAS* más leídos vía internet durante el mes de abril de 2009. Puede obtener el artículo comunicándose con [calderom@si.edu](mailto:calderom@si.edu)



## Giacalone-Willis appointed STRI's communication associate

Today, June 5, STRI acting deputy director William T. Wcislo re-appointed Jacalyn Giacalone-Willis as STRI's communication associate.

Giacalone-Willis and husband Gregory Willis from Montclair State University in New Jersey, have conducted several long-term projects on BCI, greatly contributing to STRI's education and outreach efforts.

Both scientists have worked on mammalian population fluctuations in relationship to the Island's fruit crop and conducted annual censuses of Barro Colorado mammals. In order to monitor which mammals are present, Jacalyn and Greg Willis have scattered tripwire cameras throughout BCI. They have photographed jaguarundis, margays, pumas and ocelots; recently, they captured photos of a jaguar that had presumably swum to the Island from mainland.

El viernes 5 de junio, el subdirector encargado William T. Wcislo renovó el nombramiento de Jacalyn Giacalone Willis como comunicadora asociada de STRI.

Giacalone-Willis y su esposo Gregory Willis, ambos de Montclair State University en New Jersey, han llevado a cabo proyectos a largo plazo en BCI, contribuyendo en gran medida a los esfuerzos de educación y extensión de STRI.

Ambos científicos han trabajado en la fluctuaciones de las poblaciones de mamíferos en la Isla, y han llevado a cabo censos anuales de mamíferos en Barro Colorado.

Para monitorear qué mamíferos están presentes en la Isla, Jacalyn y Greg Willis han colocado cámaras con sensores de movimiento en



Jacalyn Giacalone-Willis, 2004

varios lugares de Barro Colorado. Estas cámaras han registrado jaguarundis, margays, pumas, ocelotes y recientemente lograron captar las primeras fotografías de un jaguar, que se presume que nadó desde tierra firme.

