



Smithsonian

# 100 years of science in Panama



Smithsonian Tropical Research Institute, Panamá

STRI news

[www.stri.si.edu](http://www.stri.si.edu)

November 11, 2011

## Paleo-Talk

Monday, November 14, 4pm  
at the Center for Tropical  
Paleoecology and Archaeology,  
Paleo-talk speaker will be Jorge  
W. Moreno, STRI intern.

**Fossil vertebrates from the  
Castilletes Formation  
(Miocene-Pliocene) of  
Northernmost Colombia:  
Age, environment, and an  
inmigrant taxon, but not  
from North America**

## Tupper seminar

Tuesday, November 15, 4pm  
seminar speaker will be Alex  
Cheesman, STRI

**Phosphorous in wetland  
soils: Dynamic sources and  
cycling of a critical nutrient**

## Bambi seminar

Thursday, November 17,  
Bambi seminar speaker will be  
Erin R. Spear, University of  
Utah

**Do pathogens determine  
tree species distributions  
across a rainfall gradient?**

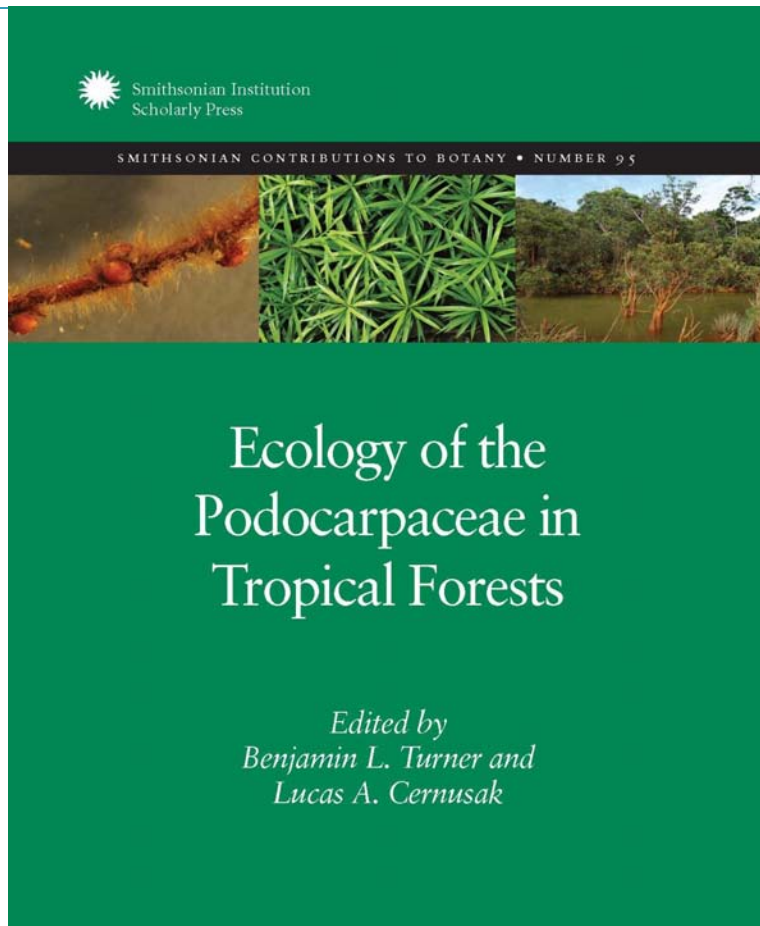
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## New STRI book

The Smithsonian Institution  
Scholarly Press just published  
*Ecology of the Podocarpaceae in  
tropical forests* (2011), edited by  
STRI staff scientist Benjamin  
L. Turner and Lucas A.  
Cernusak, from the Australian  
National University. The book  
is issue 95 of the Smithsonian  
Contributions to Botany series.  
It can be accessed and  
downloaded at:  
[http://www.sil.si.edu/smithsoniancontributions/Botany/sc\\_title.cfm?StartRow=11](http://www.sil.si.edu/smithsoniancontributions/Botany/sc_title.cfm?StartRow=11)

The volume arises from a  
workshop held at Macquarie  
University, Sydney, in 2009,  
exploring in detail the ecology  
of the Podocarpaceae, a large  
family of mainly Southern  
Hemisphere conifers,  
comprising in tropical forests.  
It covers phylogeny and  
paleohistory of the  
Podocarpaceae in the tropics;  
current distribution of  
podocarps in the African,  
American, and Asian tropics,  
and ecology and ecophysiology  
of the Podocarpaceae in  
both temperate and tropical  
ecosystems

“The volume concludes with a  
short synthesis that concisely  
summarizes the key  
conclusions of the workshop.  
The outcome is a truly  
interdisciplinary review of



tropical podocarps, which we  
hope will inspire further  
research on these fascinating  
trees” conclude the editors.

Smithsonian Institution  
Scholarly Press acaba de  
publicar el libro *Ecology of the  
Podocarpaceae in tropical  
forests* [Ecología de  
Podocarpaceae en bosques  
tropicales] 2011, editado por el  
científico de STRI, Benjamin  
Turner y Lucas A. Cernusak, de  
la Universidad Nacional de  
Australia. El libro es el volumen  
95 de la serie Smithsonian

Contributions to Botany, y se  
puede acceder y obtener desde:  
[http://www.sil.si.edu/smithsoniancontributions/Botany/sc\\_title.cfm?StartRow=11](http://www.sil.si.edu/smithsoniancontributions/Botany/sc_title.cfm?StartRow=11)

El nuevo volumen surge de un  
taller que se celebró en  
Macquarie University en Sidney  
en 2009, y explora en detalle la  
ecología de los Podocarpaceae,  
una familia del Orden Pinales, en  
bosques tropicales. Cubre los  
tópicos de filogenia y paleohis-  
toria de los Podocarpaceae en  
los trópicos, la distribución  
actual de podocarpos en los

## Arrivals

Pedro Antonio Gonzalez Sicard, Instituto Tecnológico de Costa Rica, to join the Agua Salud Project-Hydrologic Studies, at Tupper.

Matthew Bulbert, Macquarie University, to work on understanding the function of exaggerated morphology seen in the insects of Panama, in Gamboa.

Katherine Cure Chams, University of Guam, to work on assessing the effects of the rise of the isthmus of Panama on the life history characteristics of reef fishes to understand factors affecting life history evolution.

Juan David Beltrán Parra, Universidad de Los Andes, to study physiological, morphological and anatomical changes during the ontogeny of the *Tilandsioideae* subfamily, on BCI.

## Departures

Edgardo Ochoa to Washington DC, for meetings at the Office of the Undersecretary for Science and participate in a Diving Medical Panel.

Lisa Barnett to Boston, MA, to attend the HSBC North America meeting.

Mary Jane West-Eberhard to Panama, on official business at STRI.

Rachel Collin to Annapolis, MD, to attend Marine GEO workshop organized by Whitman Miller and Nancy Knowlton.

trópicos de Africa, América y Asia, y la ecología y ecofisiología de los Podocarpaceae tanto en ecosistemas templados como en ecosistemas tropicales. "El

## Tropical forests are fertilized by air pollution

Studies at two sites of the SI Global Earth Observatories in Panama and Thailand show the first evidence of long-term effects of nitrogen pollution in tropical trees. The results of the study were published by *Science* (November 4) in the article "Long-term change in the nitrogen cycle of tropical forests" authored by a group of scientist including STRI's Ben Turner (photo at right) and Joe Wright (photo below).

"Air pollution is fertilizing tropical forests with one of the most important nutrients for growth," said STRI's S. Joseph Wright. "We compared nitrogen in leaves from dried specimens collected in 1968 with nitrogen in samples of new leaves collected in 2007. Leaf nitrogen concentration and the proportion of heavy to light nitrogen isotopes increased in the last 40 years, just as they did in another experiment when we applied fertilizer to the forest floor."

"The results have a number of important implications," said Ben Turner, staff scientist at STRI. "The most obvious is for trees in the bean family (*Fabaceae*), a major group in tropical forests that fix their own nitrogen in association with soil bacteria. Increased nitrogen from outside could take away their competitive advantage and make them less common, changing the composition of tree communities."

"There are also implications for global change models, which are beginning to include

volumen concluye con una síntesis corta que resume de forma concisa las conclusiones clave del taller. El resultado es una reseña verdaderamente interdisciplinaria de los

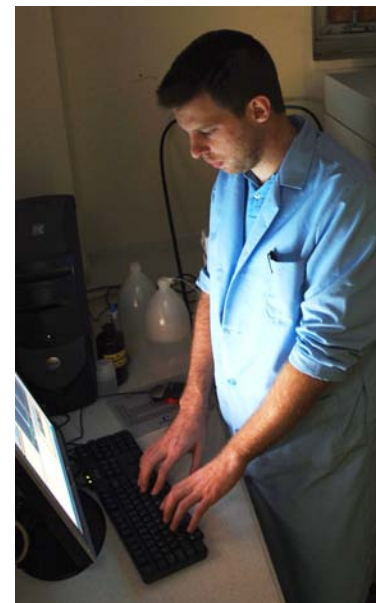
nitrogen availability as a factor affecting the response of plants to increasing atmospheric carbon dioxide concentrations," said Turner. "Most models assume that higher nitrogen equals more plant growth, which would remove carbon from the atmosphere and offset future warming. However a challenge for the models is that there is no evidence that trees are growing faster in Panama, despite the long-term increases in nitrogen deposition and atmospheric carbon dioxide."

Decades of atmospheric nitrogen deposition have caused major changes in the plants and soils of temperate forests in the U.S. and Europe. Whether tropical forests will face similar consequences is an important question for future research.

Estudios en dos de los bosques de los Observatorios Globales de la Tierra del Smithsonian, en Panamá y Tailandia arrojan luz sobre los efectos a largo plazo de la contaminación de nitrógeno en árboles tropicales.

"La contaminación aérea fertiliza los bosques tropicales proporcionándole uno de los nutrientes más importantes para su crecimiento, expresa S. Joseph Wright, de STRI. "Comparamos el nitrógeno en especímenes de hojas secas colectados en 1968 con nitrógeno de hojas nuevas colectadas en 2007. La concentración de nitrógeno en las hojas y la proporción de isótopos de nitrógeno liviano y denso aumentó en los últimos 40 años, al igual que en otro experimento donde se aplicó

podocarpos tropicales, que esperamos inspire mayor investigaciones sobre estos fascinantes árboles" concluyen los editores.



fertilizante en el suelo del bosque."

"Los resultados tienen un número importante de implicaciones," comenta Ben Turner, de STRI. "La más obvia es para los árboles de la familia de las leguminosas (*Fabaceae*), un grupo mayoritario en los bosques tropicales que fijan su propio nitrógeno en asociación con la bacteria en el suelo. Mayor nitrógeno, que aumenta desde afuera, puede restarle ventaja competitiva y hacerlo menos común, cambiando la composición de las comunidades de árboles." "También hay implicaciones para modelos de cambio global,





## New publications

Barbosa, Flavia. 2011. "Copulation duration in the soldier fly: The roles of cryptic male choice and sperm competition risk." *Behavioral Ecology* 22(6): 1332-1336.

Boyer, Denis, Crofoot, Margaret C., and Walsh, Peter D. 2011. "Non-random walks in monkeys and humans." *Journal of the Royal Society Interface* doi:10.1098/rsif.2011.0582

Cernusak, Lucas A., Adie, Hylton, Bellingham, Peter J., Biffin, Edward, Brodribb, Timothy J., Coomes, David A., Dalling, James W., Dickie, Ian A., Enright, Neal J., Kitajama, Kanehiro, G., Laddm Phillip, Lambers, Hans, Lawes, Michael J., Lusk, Christopher H., Morley, Robert J., and Turner, Benjamin L. 2011. "Podocarpaceae in tropical forest: A synthesis." In Turner, Benjamin, and Cernusak, Lucas A. (Eds.), *Ecology of the Podocarpaceae in tropical forests*, Vol. 95: 189-195. Washington DC: Smithsonian Institution Scholarly Press.

Hietz, Peter, Turner, Benjamin L., Wanek, Wolfgang, Richter, Andreas, Nock, Charles A., and Wright, S. Joseph. 2011. "Long-term change in the nitrogen cycle of tropical forests." *Science* 334(6056): 664-666.

Hughey, Myra, Nicolas, Angie, Vonesh, James, and Warkentin, Karen. 2011. "Wasp predation drives the assembly of fungal and fly communities on frog egg masses." *Oecologia* doi:10.1007/s00442-011-2137-3

los cuales están empezando a incluir la disponibilidad de nitrógeno como un factor, afectando la respuesta de las plantas al aumento atmosférico de concentraciones de dióxido de carbono," comenta Turner. "La mayoría de los modelos asumen que mayor cantidad de nitrógeno es igual a un aumento en el crecimiento de las plantas, lo que removería el carbono de la atmósfera y contrarrestaría un futuro calentamiento. Sin embargo, un reto para estos modelos es que no hay evidencia de que

los árboles estén creciendo más rápido en Panamá, a pesar de los aumentos a largo plazo en la destitución de nitrógeno y dióxido de carbono atmosférico."

Décadas de acumulación de nitrógeno han causado cambios mayores en las plantas y suelos de bosques templados en EEUU y Europa. Que los bosques tropicales encaren consecuencias similares o no, es una pregunta importante para estudios futuros.



## Meet our scientist:

### Rachel Collin

#### New Smithsonian

video <http://www.youtube.com/user/SmithsonianVideos>

“Meet Rachel Collin, a staff scientist and director of the Bocas del Toro Research Station at the Smithsonian Tropical Research Institute in Panama. Rachel studies the evolution of marine gastropods (snails) and oversees multiple disciplines of marine biology at the Collin Lab in Bocas del Toro.”

“Conozca a Rachel Collin, científica de planta y directora de la Estación de Investigaciones del Smithsonian Tropical Research Institute en Bocas del Toro. Rachel estudia la evolución de gasterópodos marinos (caracoles) y supervisa múltiples disciplinas de la biología marina en su Laboratorio en la Estación de Bocas del Toro.

## New publications

Kapheim, Karen M., Smith, Adam R., Ihle, Kate E., Amdam, Gro V., Nonacs, Peter, and Wcislo, William T. 2011. "Physiological variation as a mechanism for developmental caste-biasing in a facultatively eusocial sweat bee." *Proceedings of the Royal Society B: Biological Sciences* doi:10.1098/rspb.2011.1652

Kays, Roland, Tilak, Sameer, Kranstauber, Bart, Jansen, Patrick A., Carbone, Chris, Rowcliffe, J. Marcus, Fountain, Jay, and He, Zhihai. 2011. "Camera traps as sensor networks for monitoring animal communities." *International Journal of Research and Reviews in Wireless Sensor Networks* 1(2): 19-29.

Lasso, Eloisa, Dalling, James W., and Bermingham, Eldredge. 2011. "Strong spatial genetic structure in five tropical Piper species: should the Baker–Fedorov hypothesis be revived for tropical shrubs?" *Ecology and Evolution* doi:10.1002/ece3.40

Quesada, Rosannette, Triana, Emilia, Vargas, Gloria, Douglass, John K., Seid, Marc A., Niven, Jeremy E., Eberhard, William G., and Wcislo, William T. 2011. "The allometry of CNS size and consequences of miniaturization in orb-weaving and cleptoparasitic spiders." *Arthropod Structure & Development* doi: 10.1016/j.asd.2011.07.002

Turner, Benjamin (Ed.). 2011. *Ecology of the Podocarpaceae in tropical forests* (First ed.). (Vol. 95). Washington DC: Smithsonian Institution Scholarly Press.