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100 years of science in Panama



Smithsonian Tropical Research Institute, Panamá

STRI news

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September 17, 2010

Gamboa 11am seminar

Monday, September 20, at 11am, Gamboa seminar series speaker will be Bryson Voirin, Max Planck Institute
Sleeping on the Limb: Short sleep in two sloth species recorded in the wild

Tupper seminar

Tuesday, September 21, 4pm Tupper seminar speaker will be Oscar Puebla, STRI postdoctoral fellow
Pairing dynamics and the origin of species

Bambi seminar

Thursday, September 23, Bambi seminar speaker will be Ryan Chisholm, STRI
A theoretical model linking interspecific variation in density-dependence to species abundances

Arrivals

Dave Marvin, University of Michigan, to study the response of tropical liana and tree seedlings to elevated CO₂ and seasonal precipitation, in Gamboa.

Jacalyn Giacalone and Gregory Willis, Montclair State University, to conduct the annual mammal census, on BCI.

Will short-term reforestation projects meet your expectations?

Secondary forests are gaining increased importance in tropical landscapes and have recently been reported to act as potential belowground carbon sinks. While economic interest in the management of secondary forests to mitigate carbon emissions is rising, the dynamics of soil carbon stocks under these ecosystems remain poorly understood.

Luise Neumann-Cosel from Potsdam University in Germany, and colleagues from Postdam and STRI, published “Soil carbon dynamics under young tropical secondary forests on former pastures—A case study from Panama” online in the journal *Forest Ecology and Management*, with support from the HSBC Climate Partnership.

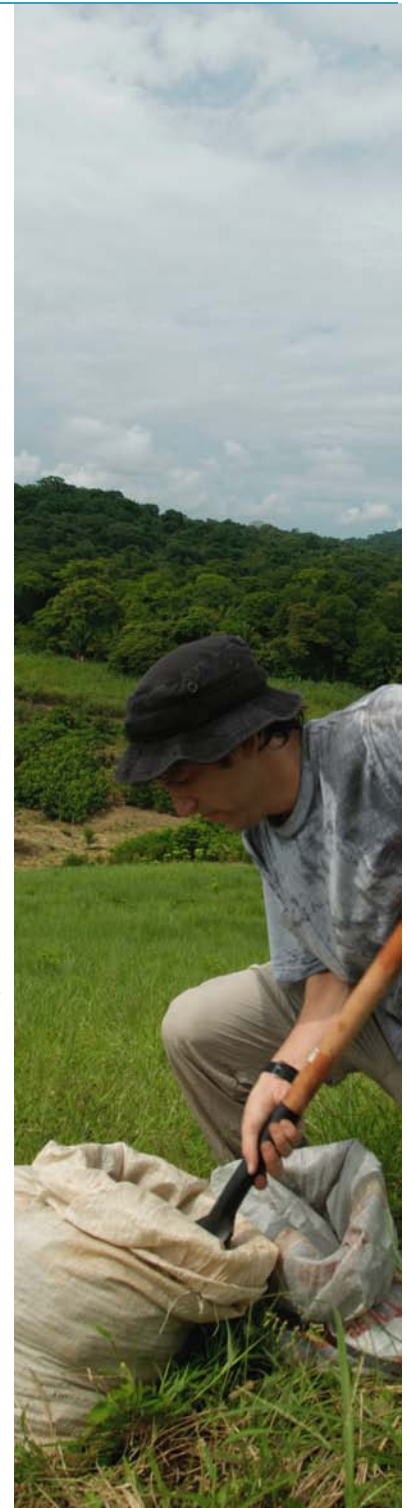
The team of researchers, including STRI post-doctoral fellows Beate Zimmermann and Michiel van Breugel and staff scientist Jefferson Hall, measured 24 active secondary forests and compared them to a mature forest in similar abiotic conditions. The abiotic components are non-living chemical, hydrological and other physical factors in the environment.

The results indicated that in 5- to 15-years-old secondary forests, there was no change in carbon sequestration. In a 100-year-old secondary forest, the sequestration was higher, and approached the values of a mature forest. Undertaking short-term reforestation projects with an expectation of increasing soil carbon sequestration in a few decades is challenged by these results.

More studies are needed to assess environmental conditions and soil properties in association with land-use transition.

Los bosques secundarios están ganando cada vez más importancia en los paisajes tropicales y recientemente se ha informado que pueden actuar como depósitos de carbono bajo la tierra. Mientras el interés económico en el manejo de bosques secundarios crece con el fin de mitigar emisiones de carbono, la dinámica de los depósitos de carbono en el suelo bajo estos ecosistemas sigue siendo poco comprendido.

Luise Neumann-Cosel de la Universidad de Postdam en Alemania y colegas de Postdam



Arrivals

Katie Cramer, Scripps, to study the historical changes in coral communities along a gradient of land use in Panama, on Bocas del Toro.

Nicole Fogarty, SI, to study chemical cues for reproduction and recruitment in Caribbean corals, on Bocas del Toro.

Amanda Feuerstein, Laetitia Plausance and Ryuji Machida, SI, to study coral spawning in *Montastraea annularis* complex, on Bocas del Toro.

Randal Moore, Oregon State University, to conduct ESP bird monitoring in the BCNM.

James Walters, Richard Merrill and Richard Wallbank, University of Cambridge, to study the evolution of mimicry in *Heliconius*, in Gamboa.

Peter and Anne Meyland, Eckerd College, to continue studies on the ecology and migrations of marine turtles of Bocas del Toro province, Panama.

Departures

Steve Paton to Washington, DC on official business at SI, and Pellston, MI, to attend the 2010 Annual Organization of Biological Field Stations meeting.

Fernando Santos-Granero to Lima, Peru, to work on a publication with Frederica Barclay, and consult the National Library Archive and the Nation's Archive.

Javier Mateo to New Haven, CT, to attend meetings at Yale University.

John Christy to Perth, Australia, to give a talk at the bi-annual meeting of the International Society for Behavioral Ecology.

y STRI, publicaron “Soil carbon dynamics under young tropical secondary forests on former pastures—A case study from Panama” [La dinámica del carbono en la tierra bajo bosques secundarios tropicales sobre antiguos pastizales] en la versión electrónica de la revista *Forest Ecology and Management*, con apoyo del HSBC Climate Partnership.

El equipo de investigadores, incluyendo a los becarios postdoctorales Beate Zimmerman y Michiel van Breugel, y el científico de STRI, Jeff Hall, midió 24 bosques secundarios activos y los compararon con bosques maduros, en condiciones abióticas similares. Los componentes abióticos son factores químicos, hidrológicos y otros aspectos físicos no vivos del ambiente.

Los resultados indicaron que en bosques secundarios de 5 a 15



Beate Zimmermann & Michiel van Breugel

años no hubo ningún cambio en cuanto al secuestro de carbono. En un bosque secundario de 100 años de edad, el secuestro fue mayor, y acercándose a los valores de un bosque maduro. Los resultados ponen en tela de duda el uso de proyectos de reforestación a corto plazo con la expectativa de elevar el secuestro de

carbono atmosférico en pocas décadas.

Se requerirán más estudios para medir las condiciones ambientales y las propiedades de la tierra junto con los cambios en el uso de ésta.

Seventh CTFS census completed on BCI!

STRI's Center for Tropical Forest Science (CTFS) toasted the completion of the 2010 field census of the Barro Colorado Island (BCI) 50-ha Forest Dynamics Plot on Wednesday, September 15. The enumeration and mapping of 225,000 trees wound down this past week. The field and data entry crew met for congratulations and farewells at the CTFS lab on BCI, together with other members of the Center who contributed to the census from mainland.

Ecologists at STRI established the first plot on BCI in 1980. There, they pioneered long-term tree-census techniques that were replicated by scientists throughout the



tropics, creating a network of forest research plots that would eventually become the CTFS. Before 1980, scientists had never attempted to measure tropical forests so intensively and on such a large scale. Today, the scale and intensity of the CTFS research program remain unprecedented in forest science.

The CTFS conducts field censuses every five years in its Forest Dynamic Plots spread over 21 countries in America, Asia, Africa and Europe. The first census ever conducted was on BCI's plot from 1981 to 1983. Studies based on information gathered from these censuses show how tropical forests regenerate, how

Departures

Carlos Jaramillo to La Plata, Argentina, to give a talk at The Latin-American Congress of Paleontology.

Aquiles Navarro to Washington DC, on official business at OFEO, SI.

Oris Sanjur to Ontario, Canada, to attend the International Barcode of Life Scientific Steering Committee (IBOL) meeting and official activation.

Sergio Dos Santos to Pellston, Michigan, to attend the 2010 Annual Organization of Biological Field Stations Meeting.

New publications

Hassler, Sibylle K., Zimmermann, Beate, van Breugel, Michiel, Hall, Jefferson S., and Elsenbeer, Helmut. 2010. "Recovery of saturated hydraulic conductivity under secondary succession on former pasture in the humid tropics." *Forest Ecology and Management Online*.

Hughes, Terry P., Graham, Nicholas A.J., Jackson, Jeremy B.C., Mumby, Peter J., and Steneck, Robert S. 2010. "Rising to the challenge of sustaining coral reef resilience." *Trends In Ecology & Evolution Online*.

Kim, Yong-Kyu, Weber, M.B.I., Anderson, W.W., and Gowaty, Patricia Adair. 2010. "Preference status does not indicate intrinsic quality differences in *Drosophila pseudoobscura*." *Integrative Zoology* 5(3): 198-207.

Kraft, Nathan J.B., Metz, Margaret R., Condit, Richard S., and Chave, Jerome. 2010. "The relationship between wood density and mortality in a global tropical forest data set." *New Phytologist Online*.



Census team on BCI and mainland
Equipo del censo en BCI
y tierra firme

they can be managed and conserved, and how to maintain their rich diversity.

According to BCI's scientific coordinator Oris Acevedo, who participated in the review process of the first census in 1985, one of the most important contributions of the BCI plot and these censuses has been the training of numerous Panamanian biologists who have developed their skills in plant identification in the field on BCI. "If Barro Colorado Island was already a center of attention for many tropical researchers in the Old and New World, it was the BCI 50-hectare plot and its censuses that provided a school for young Panamanian biologists and a model for long-term studies on forest dynamics around the world, including temperate forests," commented Acevedo.

During the censuses, every woody stem with a diameter of one centimeter or above at breast height and above (1.33m) is tagged, measured, mapped and identified to the species level. CTFS researchers use the

data as the basis for silvicultural, socio-economic and ecological research, providing information for environmental decision making.

With all the information gathered at the BCI plot on the natural history of every tree and every species hosted by the plot, it became famous and very attractive to botanists and other researchers doing work in the tropics, to the point that all of them wanted to conduct projects there. Due to the great scientific demand, BCI had to establish a new 25-hectare plot to accommodate their needs while protecting the integrity of the natural dynamics occurring in the original plot.

The Smithsonian Institution Global Earth Observatories (SIGEO) are evidence of the incredible value of the plots and of the information gathered during the censuses and the analyses conducted by CTFS researcher, with the support of the HSBC Climate Partnership. SIGEO builds on and expands the CTFS global network of forest plots, transforming it

into a platform for a broader range of scientific investigations of current relevance. CTFS research on tropical forest dynamics continues, but joins new initiatives to study carbon fluxes, temperate forests, and the impacts of climate change on biodiversity and forest function.

This year's census was led by Rick Condit and supervised by Rolando Pérez and Salomón Aguilar, with technicians Antonio Aguilar, Guillermo Aguilar, Luis Aguilar, Boris Bernal, Biancolini Castro, Nefertaris Daguerra, Daryelis Fernández, Mayté Fernández, Mitzila Gaitán, Luis-Alfredo Martínez, Jorge Martínez, Irene Torres, and Oldemar Valdés.

El Centro de Ciencias Forestales del Trópico de STRI (CTFS) brindó por la finalización del censo de campo 2010 de la Parcela de Dinámica de Bosques de Barro Colorado, el miércoles, 15 de septiembre. La enumeración y localización de 225,000 árboles se completó esta semana. El equipo de campo y los captadores de

New publications

Lettieri, L., and Streebman, J.T. 2010. "Colourful stripes send mixed messages to safe and risky partners in a diffuse cleaning mutualism." *Journal of Evolutionary Biology* Online.

Neumann-Cosel, Luisa, Zimmermann, Beate, Hall, Jefferson S., van Breugel, Michiel, and Elsenbeer, Helmut. 2010. "Soil carbon dynamics under young tropical secondary forests on former pastures--A case study from Panama." *Forest Ecology and Management* Online.

Norden, N., Mesquita, R.C.G., Bentos, T.V., Chazdon, R.L., and Williamson, G. Bruce. 2010. "Contrasting community compensatory trends in alternative successional pathways in central Amazonia." *Oikos* Online.

Ogden, Fred L., Stallard, Robert F., Elsenbeer, Helmut, and Hall, Jefferson. 2010. Panama Canal Watershed Experiment-Agua Salud Project. Paper presented at the AWRA 2010 Summer Specialty Conference, August 30-September 1, 2010, San Juan, Puerto Rico.

Orwin, K.H., Buckland, S.M., Johnson, D., Turner, Benjamin L., Smart, S., Oakley, S., and Bardgett, R.D. 2010. "Linkages of plant traits to soil properties and the functioning of temperate grassland." *Journal of Ecology* 98(5): 1074-1083.

Stallard, Robert F., Ogden, Fred L., Elsenbeer, Helmut, and Hall, Jefferson. 2010. "Panama Canal Watershed Experiment: Agua Salud Project." *Water Resources Impact* 12(4): 17-20.

Vencl, F., Trillo, P., and Geeta, R. 2010. "Functional interactions among tortoise beetle larval defenses reveal trait suites and escalation." *Behavioral Ecology and Sociobiology* Online.

datos se reunieron en el Laboratorio del CTFS en BCI en una ceremonia de agradecimiento y despedida con otros miembros del Centro que también contribuyen con el censo, desde tierra firme.

Un grupo de ecólogos en STRI estableció la primera parcela de Dinámica de Bosques en Barro Colorado en 1980. Fueron los pioneros de técnicas para censar árboles a largo plazo, que los científicos han duplicado en los trópicos, creando una red de parcelas de bosques para la investigación que más adelante se convirtió en el CTFS. Antes de 1980, los científicos nunca habían tratado de medir los bosques tropicales tan intensamente ni a tan gran escala. Hoy día la escala e intensidad del programa de investigaciones del CTFS sigue siendo sin precedentes.

El CTFS lleva a cabo censos de campo cada cinco años en sus parcela de Dinámica de Bosques que se extienden a 21 países en América, Asia, África y Europa. El primer censo que se llevó a cabo fue en la Parcela de BCI de 1981 a 1983. Los estudios que se basan en información recogida durante estos censos muestran cómo se regeneran los bosques, cómo deben ser



administrados y conservados, y cómo mantener su rica biodiversidad.

Según Oris Acevedo, coordinadora científica de BCI quien participó en el proceso de revisión del primer censo de la Parcela en 1985, uno de los mayores valores que tiene la parcela y sus censos es la capacitación de muchos biólogos que adquieren la habilidad para identificar las plantas en el campo, en BCI. "Si la Isla de Barro Colorado era ya centro de atención para los biólogos tropicales en el Viejo y Nuevo Mundo, fue la parcela de 50 hectáreas de Barro Colorado y sus censos, los que ofrecieron una escuela para muchos biólogos panameños y un modelo para estudiar la dinámica forestal de bosques en todo el mundo, incluyendo bosques templados" comentó Acevedo.

Durante los censos, cada tronco de un centímetro de diámetro a la altura del pecho (1.33m) se marca, se mide, se localiza en un mapa y se identifica a nivel de especie. Los investigadores del CTFS utilizan esta información para estudios silviculturales socio-económicos, y ecológicos, ofreciendo así información necesaria para la toma de decisiones ambientales.

Debido a toda la información recogida sobre la vida natural de cada uno de los árboles y las especies que viven en la parcela de Barro Colorado, ésta adquirió tal fama entre botánicos y otros investigadores internacionales que todos querían llevar a cabo sus proyectos en ella. Ante la gran demanda científica, BCI tuvo que establecer una nueva parcela de 25 hectáreas, para acomodar sus necesidades y al mismo tiempo proteger la

integridad de la dinámica natural de la parcela original.

Los Observatorios Globales de la Tierra del Smithsonian (SIGEO) son prueba del incalculable valor que tienen las parcelas del CTFS y la información recogida durante los censos y analizada por los investigadores del Centro, con el apoyo del HSBC Climate Partnership. SIGEO cimienta y expande la red global de parcelas de bosques del CTFS, transformándola en una plataforma de rango más amplio para investigaciones científicas de relevancia actual. Los estudios del CTFS en dinámica de bosques tropicales continúan, y se ha unido a nuevas iniciativas para estudiar los flujos de carbono, los bosques templados, y el impacto del cambio climático en la biodiversidad y las funciones forestales, con SIGEO.

El censo de este año fue liderado por el científico de planta permanente Rick Condit, supervisado por Rolando Pérez y Salomón Aguilar, del CTFS, con el apoyo de los técnicos Antonio Aguilar, Guillermo Aguilar, Luis Aguilar, Boris Bernal, Biancolini Castro, Nefertaris Daguerre, Daryelis Fernández, Mayté Fernández, Mitzila Gaitán, Luis-Alfredo Martínez, Jorge Martínez, Irene Torres, y Oldemar Valdés.

