

Tupper seminar

Tuesday, March 9, noon seminar speaker will be Manfred Ayasse, University of Ulm, Germany

Chemical ecology of sexually deceptive orchids and their pollinators

Bambi seminar

Please check your GroupWise for information on the next Bambi, or e-mail: Bambi.

Arrivals

Pablo Ribeiro, Universidad Nacional de Mar del Plata, Argentina, Mar 3 - May 3, to work with John Christy, at Naos.

Kimberly Sheldon, Mar 5-12, to work with Robert Ricklefs, in Gamboa.

Steven Groh, project manager at SI's Office of Facilities Engineering and Operations, Mar 6-14, for an inspection visit of STRI facilities.

Martin Wikelski and Kelly Lee, Princeton University, Mar 6 - Apr 11, to work on BCI's Automated Telemetry Project.

Julie Velasquez-Runk, Yale University, Mar 6-21, to work on the historical ecology of Wounaan forest use in Eastern Panama, at Tupper and Darien.

Hans Ulrich Schnitzler and Andrea Schaub, University of Tuebingen, Mar 7-28, to study echolocation strategies of gleaning bats, on BCI.

Courtney Babbitt, University of California at Berkeley, Mar 7-28, to study the developmental systematics within the Amphipoda (Crustacea: Malacostraca: Paracarida), at Bocas.



Smithsonian Tropical Research Institute, Panama

www.stri.org

March 5, 2004



J. Andrew C. Smith, former STRI senior Mellon fellow from Oxford University, UK, during a recent research visit to Panama, examining a bromeliad species at STRI's new Santa Cruz experimental site in Gamboa ••• J. Andrew Smith, antiguo becario "senior" de Mellon de la Universidad de Oxford en el Reino Unido, examina una especie de bromelia en las nuevas instalaciones de STRI en Santa Cruz, Gamboa, en un reciente viaje de investigaciones a Panamá.

PNAS: origins of CAM and the epiphytic habit in Bromeliaceae

One of the most conspicuous components in the canopies of Neotropical forests are members of the pineapple family (Bromeliaceae), a large group of functionally diverse plants comprising almost 3000 known species. While pineapple (*Ananas comosus*) and many other bromeliads are soil-rooted terrestrial plants, about half of the species are detached from the soil and grow epiphytically on the surfaces of branches in tree crowns, deriving their moisture and nutrients primarily from the air and rain. Some of the most extreme epiphytes are

Uno de los componentes más conspicuos de los doseles en los bosques neotropicales son los miembros de la familia de la piña (Bromeliaceae), un grupo extenso de plantas funcionalmente diversas con cerca de 3000 especies conocidas. Mientras que la piña (*Ananas comosus*) y muchas otras bromelias son plantas terrestres con raíces en la tierra, cerca de la mitad de estas especies se desprenden de la tierra y crecen epifíticamente sobre ramas en la corona de los árboles y obtienen su humedad y nutrientes del aire y la lluvia primordialmente. Algunas de estas epífitas extre-

More arrivals

Jeff Brawn, Illinois Natural History Survey, Mar 7-30, to continue monitoring the dynamics of avian communities and population in Central Panama, in Gamboa.

Robb Brumfield, Louisiana State University, Mar 8 - Apr 27, to work with John Albert Uy, in Gamboa.

William Browne and Mark Martindale, University of Hawaii, Mar 8-24, to study the developmental systematics within the Amphipoda, (Crustacea: Malacostraca: Peracarida), at Bocas.

Michael Braun, SI's National Museum of Natural History, Mar 8 - Apr 8, to study the hybridization and evolution of brilliant plumage traits in *Manacus* manakins and the speciation in *Sublegatus* flycatchers, at Naos.

Manfred Ayasse, University of Ulm, Germany, Mar 9 - 15, to visit STRI, consult with colleagues, and present seminar.

Andy South, UK, Mar 10, to work with the Automated Telemetry Project as system manager, on BCI.

Alan Cohen, University of Missouri, Mar 10-29, to work with Robert Ricklefs, in Gamboa.

Allen Collins, ITZ Ecology and Evolution, Mar 12-13, to document Medusae at Bocas del Toro.

Thomas Dijkstra and Irene Tieleman, University of Copenhagen, Mar 12 - May 31, to work with Jacobus Boomsma, in Gamboa.

almost rootless "air plants", like the bromeliad *Tillandsia usneoides* (Spanish moss), which can even occupy hostile habitats such as the surfaces of cables high above the ground. One key innovation enabling bromeliads to occupy these stressful, microclimatically arid epiphytic niches is a water-conserving form of photosynthesis known as crassulacean acid metabolism (CAM). This allows for gas exchange with the atmosphere and uptake of carbon dioxide primarily at night when the risk of dehydration is reduced. In order to clarify the evolutionary origins of CAM photosynthesis and the epiphytic habit, STRI staff scientist Klaus Winter with Australian postdoctoral fellow Darren M. Crayn and STRI senior Mellon fellow J. Andrew C. Smith from the UK, conducted a molecular phylogenetic analysis combined with a detailed survey of photosynthetic pathways of the Bromeliaceae family. The results, which will be published in a forthcoming issue of the *Proceedings of the National Academy of Sciences USA* (101: 3703-3708; March 9, 2004) demonstrate that both CAM photosynthesis and the epiphytic habit evolved multiple times in the family, most likely in response to geological and climatic changes in the late Tertiary. The study also showed that CAM was lost in some lineages following their radiation back into less stressful sites. As part of their program on functional biodiversity in tropical ecosystems, Winter and colleagues will extend their studies on the origins of the CAM mode of photosynthesis to other groups of vascular plants. Understanding from plants in the wild how they cope with various forms of environmental stress may eventually facilitate the development of more stress-tolerant types of crop plants for cultivation in the world's marginal lands.

Panamanian decrees based on STRI work

Two recent decrees were announced in the Panamanian *Gaceta Oficial* [Official Records] N° 24,963 of January 8th, 2004, based on three publications authored by STRI staff scientist Hector M. Guzman and collaborators. The first decree prohibits the extraction, possession and commercialization of the sea cucumber (Echinodermata: Holothuroidea) in Panamanian waters^{1,2}.

The second decree establishes a 5-year ban on conch (*Strombus spp.*) harvest in Panama³. Queen conch is listed by CITES in Appendix II since 1992.

Both decrees are very important to marine biodiversity conservation and for the developing of sustainable fishing practices in Panama. International trade in sea cucumbers soared during the 1980's. Nearly 10,000 tons of dried sea cucumber enter the

mas casi no tienen raíces; son "plantas aéreas" como la bromelia *Tillandsia usneoides* (hongo español), que puede incluso ocupar hábitats hostiles como la superficie de tendidos eléctricos. Una novedad clave que permite que estas bromelias ocupen estos nichos epifíticamente áridos con un microclima de gran estrés, es la forma de conservar agua del metabolismo de ácido crasuláceo (CAM). Este permite el intercambio de gases con la atmósfera y obtiene casi todo su dióxido de carbono en la noche, cuando el riesgo de deshidratación es menor. Para aclarar los orígenes evolutivos de la fotosíntesis CAM y el hábitat epifítico, el científico de STRI Klaus Winter, junto con el becario posdoctoral australiano Darren M. Crayn y el becario "senior" de Mellon J. Andrew Smith del Reino Unido, llevan a cabo un análisis filogenético molecular combinado con un estudio detallado de los pasos de la fotosíntesis de la familia Bromeliaceae. Los resultados, que serán publicados próximamente en *Proceedings of the National Academy of Sciences* (101: 3703-3708, del 9 de marzo de 2004) demuestran que tanto la fotosíntesis CAM como el hábito epifítico evolucionaron múltiples veces en la familia, casi siempre en respuesta a cambios geológicos y climáticos que se dieron a finales del Terciario. El estudio muestra también que el CAM se perdió en algunos linajes siguiendo su radiación de regreso a lugares de menos estrés. Como parte de su programa de biodiversidad funcional en ecosistemas tropicales, Winter y sus colegas extenderán sus estudios sobre la forma CAM de fotosíntesis a otros grupos de plantas vasculares. Aprender cómo las plantas silvestres logran sobrevivir con diferentes tipos de estrés, puede eventualmente facilitar el desarrollo de cultivos más tolerantes al estrés, para la agricultura de tierras marginadas del mundo.



Héctor Guzman

Departures

Olga F. Linares, Mar 3-6, to Washington DC, to serve as representative of the National Academy of Sciences, on two Ford Foundation Fellowship meetings.

Congratulations!

To Bill and Susan Laurance, for the birth of their son Nathan Barry, on Thursday, March 4. He weighed 8lb 10oz and measured 53cm.

Get well soon!

To STRI staff scientist Henk Wolda (retired), who is back home in Bellevue, WA, after a successful double bypass and major repair to both heart valves.

New publication

Bernardi, Giacomo, Bucciarelli, G., Costagliola, D., Robertson, D. Ross, and Heiser, J.B. 2004. "Evolution of coral reef fish *Thalassoma* spp. (Labridae). 1. Molecular phylogeny and biogeography." *Marine Biology* 144(2): 369-375.

Tewfik, Alexander, and Guzman, Hector M. 2003. "Shallow-water distribution and population characteristics of *Strombus gigas* and *S. costatus* (Gastropoda Strombidae) in Bocas del Toro, Panama." *Journal of Shellfish Research* 22(3): 789-794.

☞ Some of the articles listed in this section can be obtained in .pdf at: calderom@si.edu

For sale

Washing machine, \$125, folding couch, \$20. Interested please call George Angehr at 264-2781.

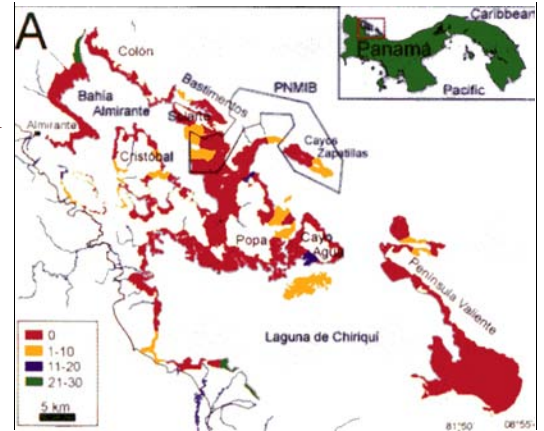
international seafood market each year. But it takes a sea cucumber between 5-8 years to reach reproductive maturity. On the other hand, during the past 30 years, the overall harvest of queen conch has increased substantially, driven by international export, growing resident populations and increasing tourism in the Caribbean region. Conch is commercially exploited in at least 22 countries in the region and is often consumed only as a luxury food item due to its relative rarity and high market value. Their slow growth, occurrence in shallow waters, late maturation, and mass spawning make queen conch particularly susceptible to over-fishing, their greatest threat. The United States is responsible for the consumption of 80% of the world's internationally traded queen conch.

(1) Guzman, Guevara & Hernandez, 2003. *Mar Biol* 142:271. (2) Guzman & Guevara, 2002. *Car. J. Sci.* 38: 230 (3) Guzman & Tewfik, 2003. *J. Shell. Res.* 22: 789.

La Gaceta Oficial de Panamá No. 24,963 del 8 de enero de 2004, anunció recientemente dos nuevos decretos basados en publicaciones del científico Héctor M. Guzmán de STRI, y sus colaboradores. El primer decreto prohíbe la extracción, posesión y comercialización del pepino de mar (Echinodermata: Holothuroidea) en aguas panameñas^{1,2}.

El segundo decreto establece una veda de cinco años para el cultivo del caracol marino en Panamá³. El caracol marino aparece listado por la Convención sobre Comercio Internacional de Especies en Peligro de Fauna y Flora Silvestre (CITES, por sus siglas en inglés) en el Apéndice II desde 1992.

Ambos decretos son de gran importancia para la conservación de la biodiversidad marina y para el desarrollo de prácticas pesqueras sostenibles en Panamá. El comercio internacional de pepinos de mar subió exponencialmente durante la década de 1980. Cerca de 10,000 toneladas de pepino de mar entran en el mercado internacional de mariscos cada año. Pero al pepino de mar le toma entre 5-8 años llegar a su madurez reproductiva. Por otro lado, durante los últimos 30 años, el cultivo general del caracol marino ha aumentado substancialmente debido a la exportación internacional, el crecimiento de poblaciones residentes y el aumento del turismo en el área del Caribe. El caracol marino se explota en por lo menos 22 países de la región, y por lo general se considera un delicatessen por su escasez y alto valor en el mercado. Su lento crecimiento en aguas someras, maduración tardía y desove en masa hacen que el caracol marino sea especialmente susceptible a la pesca excesiva, su mayor amenaza. Los Estados Unidos consumen el 80% del caracol marino que entra en el mercado internacional.



Losos: new chair of SCS

Elizabeth Losos, director of STRI's Center for Tropical Forest Science, was named the new chair of the Smithsonian Congress of Scholars (SCS), an organization composed of representatives from all the museums and units that carry out scholarly research. SCS' goal is to enhance communications among scholarly staff across SI and to address issues of common concern to the SI research community. One of the activities sponsored by SCS is the Smithsonian Science Seminar Series, a monthly series that brings together scientists from across the Smithsonian. Losos opened the 2004 Series with the talk "Tropical forest diversity and dynamism: findings from a large-scale plot network." In February, STRI scientist William F. Laurance presented "The future of the Amazon: projecting trends in development and deforestation" to a packed audience in the Cathy Kerby Room of SI's National Museum of Natural History.

Elizabeth Losos, directora del Centro de Ciencias Forestales del Trópico de STRI, fue nombrada nueva síndica del Congreso de Académicos de SI (SCS), una organización con representantes de todos los museos y unidades que llevan a cabo investigación académica. El objetivo del SCS es el de mejorar las comunicaciones entre el personal académico de SI y estudiar asuntos de interés en común con la comunidad de investigadores de SI. Una de las actividades que realiza el SCS es la Serie de Seminarios de Ciencias del Smithsonian, un evento mensual que reúne a todos los científicos de SI. Losos inauguró la Serie del 2004 con la charla "Diversidad forestal tropical y dinamismo: descubrimientos desde una red de parcelas a gran escala." En febrero, el científico William F. Laurance de STRI, presentó "El futuro del Amazonas: Proyectando tendencias en el desarrollo y la deforestación" ante una nutrida audiencia, en el Salón Cathy Kerby del Museo Nacional de Historia Natural del Smithsonian Institution, en Washington DC.