

STRI newsletter

July 16, 1993

SMITHSONIAN TROPICAL RESEARCH INSTITUTE - Apartado 2072, Balboa, Panamá

No. 29

TUPPER CENTER SEMINARS

Tue, Jul 20, noon seminar speaker will be Jeffrey Brawn, Illinois Natural History Survey.

Physical Isolation and Geographic Variation in Neotropical Birds

Abstract

The importance of gene flow to the development and maintenance of geographic variation is unclear. In this study, the extent of geographic variations was compared among population of birds in isolated and contiguous settings. Physical isolation and presumed barriers to gene flow appeared influential, but results were conditional. Morphological vs. generic (mtDNA) traits, different species, and different scales of isolation all revealed different patterns. These results indicate that physical isolation can influence the extent of geographic variation, but question is best assessed on a case by case basis.

BAMBI

Wed, Jul 21, Bambi speaker will be Evaro Gama de Oliveira, University of Texas at Austin.

Sun Orientation in Migrant Neotropical Butterflies

For transportation arrangements call BCI.

PEOPLE

Arrivals

- Deedra McClearn and William Glanz, Cornell University, Jul 17-23, to carry out a survey of mammal communities at three forested sites in the Barro Colorado Nature Monument, at BCI.
- John Pickering, University of Georgia, Jul 22-8 Aug, to do studies of Panamanian insect diversity, survey and inventory.
- Mark Mescher, research assistant, Jul 22-Sep 94, to work on the project to study Panamanian insect diversity, survey and inventory. He will live on BCI.



Hector Guzman, STRI associate, received a honourable mention from Rolex Awards for Enterprise 1993, for his project on restoring coral reefs in the Eastern Pacific. Carlos Jelensky, general manager at Mercurio Joyeros, presented Guzman with the award during a lunch at the Union Club on July 12 ••• Héctor Guzmán, investigador asociado al STRI, ganó una mención honorífica del Programa de Premios Rolex por Iniciativa, 1993, por su proyecto de restauración de arrecifes en la región del Pacífico Oriental. Carlos Jelensky, gerente general de Mercurio Joyeros, entregó el premio a Guzmán durante un almuerzo en el Club Unión, el 12 de julio.

(Foto: M.A. Guerra)

THINGS YOU SHOULD KNOW

For Tupper Center Users ••• A los Usuarios del Centro Tupper

The alarm system at the Tupper Center will be tested by Simplex during all coming Saturdays, until it functions adequately. We appreciate your patience ••• El sistema de alarmas del Centro Tupper se estará probando durante los próximos sábados hasta que funcione adecuadamente. Agradecemos su paciencia ante esta molestia.

At Tupper Center

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| Mon, Jul 19 | Exhibit: Centro Infantil IRHE "La Arbolada", 9am, Escuela Federico Velásquez, 10:30am, Escuela Felipillo, 2pm. |
| Tue, Jul 20 | Noon seminar by Jeff Brawn, Auditorium. |
| | Exhibit: Centro Infantil IRHE "La Arbolada", 9am. Centro de Orientación Infantil INTEL, 10:30am, Escuela Felipillo, 2pm. |
| Wed, Jul 21 | Exhibit: Centro Parvulario Municipal de Sta Elena, 9am and 10:30am, Instituto Moral y Luces, 2pm. |

At Tupper Center...

- Thu, Jul 22 Exhibit: *Universidad de Panamá "Secretariado"*, 9am. Escuela Federico Velásquez, 10:30am, Escuela Harmodio Arias Villa Rosario, 2pm.
- Fri, Jul 23 *Asociaciones Cívicas Unidas* Awards Program, Auditorium, 9am.
Exhibit: *Instituto Cultural*, 9am, St. Mary's School, 10:30am, Escuela Harmodio Arias, Villa Rosario, 2pm, Escuela Casita Fátima, 3pm.

At the Culebra Marine Biological Reserve

- Tue, Jul 20 Escuela Pedro J. Sosa, 8:30am.
- Wed, Jul 21 Parvulario La Arborada, IRHE, 9am.
- Thu, Jul 22 Parvulario La Arborada, IRHE, 9am.

ANNOUNCEMENTS**Invitación a Conferencia**

La Fundación para la Conservación de los Recursos Naturales, NATURA, la Universidad Latinoamericana de Ciencia y Tecnología, ULACIT, y el Instituto Panameño de Turismo, IPAT, invitan a la comunidad académica y científica del Smithsonian Tropical Research Institute a una conferencia sobre el Cambio Climático y Conservación de la Biodiversidad en Mesoamérica el 22 de julio a las 5 de la tarde en el Salón Belvedere del Hotel Plaza Paitilla. El tema de la conferencia será la creación del corredor biológico mesoamericano, programa recién aprobado por la Comisión Centroamericana del Ambiente y Desarrollo. El expositor será Mario A. Boza, doctor en ingeniería agrónoma de la Universidad de Drexel quien desempeña el cargo de Vice-Ministro de Recursos Naturales, Energía y Minas de Costa Rica. La entrada a la conferencia es gratuita, y se ofrecerá un brindis.

Chris N. Gjording, anthropologist and author of *Conditions Not Of Their Choosing: The Guaymi Indians and Mining Multinational in Panama*, published by the Smithsonian Institution, 1991, died in Seattle, Washington on Tuesday, Jul 6. He will be remembered for his careful analysis and powerful defense of Indian rights.

POSITION AVAILABLE**Biological Aid ••• Ayudante de Biología**

Applications for biological aid will be accepted immediately to work on Barro Colorado Island and Tupper Center. Responsibilities will include tag, measure and identify all plantlets, 50cm tall in 400 one-square meter plots in the BCI Forest Dynamics Plot. Conduct the two phenology censuses. Collect 60 litter traps on Poacher's Peninsula. Also conduct 200 trap census on BCI Forest Dynamics plot and oven dry and transfer material from 60-trap census to Tupper. Maintain canopy photo analysis system during six months. Requirements: Strong background in ecology and botany; considerable experience in lowland forests in Panama; ability to work easily with scientists and other field workers at the island. Fluency in both English and Spanish is preferred. This is a half-time, temporary Federal ESP position, not to exceed six months (approximately Aug and Sep 1993 and Jan through Apr 1994). Salary: GS3 (half of \$14,603) since this is a half time position. Interested please bring curriculum vitae with recent references to the Office of Human Resources, Tivoli ••• Se recibirán aplicaciones para la posición de Ayudante de Biología a partir de hoy mismo, para trabajar en la Isla de Barro Colorado y el Centro Tupper. Responsabilidades: Poner etiquetas, medir e identificar todas las plantitas de 50cm de alto en 400 parcelas de un pie cuadrado cada una en el Proyecto de Dinámica del Bosque Tropical en Barro Colorado. Dirigir los dos censos de fenología. Hacer colecta en las 60 trampas ubicadas en la Península Poacher. También dirigir el censo de 200 trampas de la parcela del Proyecto "Dinámica del Bosque Tropical" y secar en horno y trasladar al Centro Tupper. Mantener sistema de análisis de fotografías del dosel por un período de seis meses.

Requisitos: Buena formación académica en ecología y botánica; apreciable experiencia de trabajo en las tierras bajas boscosas de Panamá; habilidad para trabajar con facilidad con científicos y otros trabajadores de campo en la isla. Preferiblemente fluidez en inglés y español. Esta es una posición de medio tiempo, temporal, federal, del Programa de Ciencias del Ambiente, por no más de seis meses (aproximadamente agosto y septiembre de 1993 y de enero a abril de 1994).

Salario: grado GS-3 (mitad de \$14,603) ya que es una posición de medio tiempo. Interesados traer currículum vitae con referencias recientes a la Oficina de Recursos Humanos en Tívoli.

Se Vende

Moto Scooter Honda 150cc. con sólo 2,500 millas. \$1000, facilidades de pago. Comunicarse con Héctor Guzmán o Gabriel Jácome.

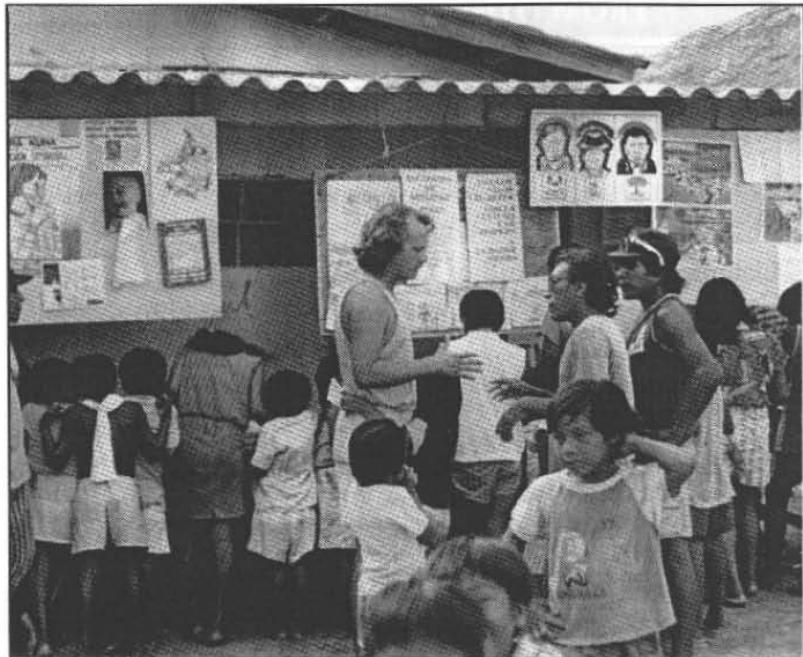
CURSO**Curso de Ecología Basada en Zonas de Vida**

El Centro Científico Tropical de Costa Rica ofrece el curso de ecología basada en zonas de vida a profesionales de Ingeniería Forestal, Biología, Agronomía, Manejo Sostenido de los Recursos, Ecología, Geografía, Conservación de la Naturaleza, Desarrollo Rural y otras áreas de los recursos naturales, del 25 de abril al 13 de mayo de 1994. El objetivo del curso es la capacitación intensiva en la clasificación de áreas y en la utilización práctica de la clasificación, siguiendo el sistema basado en Zonas de Vida, diseñado por el Dr. L.R. Holdridge. Los estudiantes recibirán un diploma de participación. Se está gestionando con una universidad local el otorgamiento de créditos académicos. El costo del curso será de \$2,700 (transporte aéreo no está incluido). El cupo está limitado a 18 personas. Para mayores detalles, comuníquese con la Oficina de Educación, Centro Tupper, o escriba directamente a Humberto Jiménez Saa, Centro Científico Tropical, Apartado 8-3870-1000, San José Costa Rica. Fax (506) 534963

Lilia Thomas Piaget, owner of "Botel Thomas" in Bocas, who helped many Smithsonian staff over the years, died on July 9.

From: 365 Ways to Save our Planet
• Page-a-Day Calendar •

It's a breeze: Get air moving through your house with a technique people have been using as long as there have been windows. Set up cross-currents by opening windows at the bottom on one side of the house and at the top on the other.



Jorge Ventocilla, de la Oficina de Educación, José Colman, director del Taller de Arte Infantil Kuna y Salomón Guerrero, del Taller de Serigrafía de Ustdup, conversan frente a una muestra de publicaciones de indígenas durante el I Encuentro de Artistas Kunas, realizado del 10-11 de julio en Ailigandí. Este encuentro fue patrocinado por la World Wildlife Foundation, la Fundación Dobbo Yala y la Oficina de Educación de STRI.

(Foto: A. Montaner)

STRI NEW PUBLICATIONS

- Bermingham, Eldredge. 1992. "Mitochondrial DNA and the Analysis of Fish Population Structure." In: *Electrophoretic and Isoelectric Focusing Techniques in Fisheries Management*: 198-221.
- Burns, Kathryn A., Garrity, Stephen D. and Levings, Sally C. 1993. "How Many Years Until Mangrove Ecosystems Recover from Catastrophic Oil Spills?" *Marine Pollution Bulletin* 26(5): 239-248.
- Eberhard, William G. 1992. "Species Isolation, Genital Mechanics, and the Evolution of Species-Specific Genitalia in three Species of *Macrodactylus* Beetles (Coleoptera, Scarabeidae, Melolonthinae)." *Evolution* 46(6): 1774-1783.
- Gómez, Iléana. 1993. "Mireya Correa: Exploradora de la Naturaleza." *La Prensa* 3 Jul: 1C.
- Guzmán, Héctor M. 1993. "Transplanting Coral to Restore Reefs in the Eastern Pacific." In: *Spirit of the Enterprise*: 409-411. Edited by David W. Reed. Bern: Buri Buri.
- Guzmán, Héctor M. and Holst, Irene. 1993. "Effects of Chronic Oil-Sediment Pollution on the Reproduction of the Caribbean Reef Coral *Siderastrea siderifera*." *Marine Pollution Bulletin* 26(5): 276-282.
- Stevens, William K. 1993. "Violent World is Facing New Dangers." *Science Times* Tue, Feb 16: C1, C9.

FROM OTHER SOURCES

Philip James DeVries, STRI alumni, received an Honourable Mention by the Rolex Awards for Enterprise 1993. DeVries received his Ph.D. in Zoology at the University of Texas at Austin. He has been a predoctoral and postdoctoral fellow at STRI and many of his publications are based on studies carried out in Panama.

Listening to the Sound of Caterpillars

Calling Ants

Members of the Riodinidae and Lycaenidae families of butterflies in all biogeographic regions form symbiotic associations with ants, in which caterpillars use their specialized glands to provide food secretions to ants in exchange for protection against enemies. Caterpillars may also produce chemicals from specialized glands that alter ant behaviour, and thereby assist in the formation of symbioses with ants.

Recently I discovered that riodinid and lycaenid caterpillars produce low-amplitude, substrate-borne, acoustical calls that attract and maintain ants in symbiotic association. An acoustical comparison showed that riodinid caterpillars produce chirping, high-frequency calls, and that lycaenid caterpillars produce drumming lower frequency calls. Substrate-borne vibrational calls are widely used by ants to communicate with nest-mates, and research has shown that caterpillar calls may mimic the calls made by ants. This suggests that caterpillars may exploit the acoustical communication system of ants in order to maintain symbiotic association.

The need to record caterpillar and ant calls

Only a tiny fraction of the total diversity of butterfly caterpillar and ant calls has been documented; for example, the calls of less than 80 of the 6,000 riodinid and lycaenid species have been recorded; out of the thousands of ant species, less than a dozen have been recorded. The diversity and nature of the calls should be explored to develop: a library of sounds in the same way as has already been done for birds, frogs and mammals before extinctions make it impossible; and a model system to research pattern of symbiotic communication between species.

I plan to travel in the African, Asian, Australian, American and the Palaearctic regions to find butterflies caterpillars and ants and record their calls. I will then perform acoustical analyses to compare similarities and differences between caterpillar and ant calls at several higher taxonomic levels, and compare calls with respect to biogeographic and habitat types. It will be necessary to record the calls of caterpillars and ants representing all or most major phylogenetic lineages, and this will provide a wealth of information to work from. At each field site, I will observe all possible caterpillar and ant-symbionts, record their calls using a Bennet-Clark particle velocity microphone and methods I have myself developed. Specimens of each caterpillar and ant species will be preserved in alcohol for identification,

morphological analyses to determine how the Lycaenidae produce calls, and to help generate a phylogeny of the Lycaenidae.

Analysing and classifying ant and caterpillar calls

The calls will be analyzed using a Kay DSP Model 5500 Sonograph and a Data 6000 wave form analyzer available to me through the American Museum of Natural History and the Department of Zoology at the University of Texas. My previous work on calls indicates that pulse rate, pulse length, dominant frequency and band width are the components with the most information for understanding these calls. Depending on the type of comparison, the appropriate statistical methods typically include ANOVA, principle component analyses, or discriminate function analyses.

Calls will first be explored by performing four related taxonomic comparisons. First, overall similarity of caterpillar and ant calls will be documented to determine the extent to which caterpillar calls 'mimic' ant calls, and identify the important call components. Second, the calls of caterpillar families and tribes will be compared to the calls of subfamilies and tribes of ant to determine whether particular caterpillar calls are more similar to particular higher level groups of ants. Third, caterpillar calls will be compared with those of ant species that are known to be predators, herbivores, scavengers, or secretion harvesters to verify that caterpillars from symbioses only with secretion harvesting ants. Finally, since ant calls are produced by stridulation or tapping, I will try to determine whether caterpillar groups specialize in one type of call or another.

I will try to detect biogeographical patterns by comparing calls from different regions to determine, for example, whether African species are distinct from Asian, or Australian, etc.; and study habitat association to find whether, as with bird and frog species, calls vary with the habitat in which they normally occur, e.g. desert, rain forest, savannah, etc.

Why explore caterpillar and ant calls?

The Riodinidae and Lycaenidae together embrace the greatest diversity of butterfly species on earth. Although many of these butterflies form symbioses with ants, most species have never received any serious study. Overall, our grasp of butterfly-ant symbioses is rudimentary at best. Among butterflies and ants there lies hidden a rich diversity of calls that await discovery and documentation. Before habitat extinctions make it impossible, I contemplate building a library of caterpillar and ant calls that will add a decidedly new collection of sounds to humankind's existing libraries of animal and insect calls (i.e., of birds, frogs, mammals). The biological system described here is the only known example where, under selection for symbiotic associations, the calls of one insect species have evolved to attract other, distantly related insect species. Thus, in the face of global destruction of biodiversity, the caterpillar-ant system provides unique opportunities to explore evolutionary biology. I am convinced that this system has much to offer. We only need explore it.