

STRI newsletter

July 24, 1992

SMITHSONIAN TROPICAL RESEARCH INSTITUTE - Apartado 2072, Balboa, Panamá

No. 30

TUPPER CENTER SEMINARS

During the noon seminar hour on Tuesday, July 28, the STRI Education Office will present the video:

El Espejo Enterrado

Resumen

Primer documental en una serie producida para la televisión por la Institución Smithsonian, narrada por Carlos Fuentes, escritor mexicano. La serie trata sobre el encuentro entre las culturas del mundo indígena americano y España.

Next Week

Noon seminar speaker for Tuesday, August 4, is Matthew Parker, State University of New York at Binghamton.

Parasites and the Evolution of Sex

Correction - BCI Bambi Seminar

Douglas Emlen's talk on Evolution of Bimodal Horn Length Variation in a BCI Beetle will be held on Tuesday, July 28, not Wednesday.

PEOPLE

Arrivals

- Martin Moynihan, senior scientist, Jul 18-Aug 15, to continue work at STRI.
- Ronald Gettinger, Randolph-Macon Women's College, July 26-31, to visit STRI facilities for possible future research and training courses.
- Else Fjerdingstad, University of Aarhus, Denmark, Jul 27-Aug 10, to work on the evolutionary ecology of mating systems in Attine leafcutter ants at Gamboa.
- Michael Swaine, Univ. of Aberdeen, Scotland and Nancy Garwood Jul 28-Aug 10, to continue soil studies on BCI.
- James Dalling, University of Cambridge, Jul 28, 1992-Jul 1993, to study the spatial and temporal patterns of rainforests soils with Michael Swaine and Nancy Garwood.



STRI obtained recently temporary use of the Gamboa School via an interagency permit from the U.S. Army. The School will be used by STRI for educational purposes, primarily for field courses. The Panama Canal Commission obtained the use of the adjacent playshelter, which includes the basketball courts ••• Recientemente, STRI obtuvo el uso temporal de la Escuela de Gamboa, a través de un permiso interinstitucional de parte del Ejército de los Estados Unidos. La escuela se usará para programas educativos de STRI, primordialmente para cursos de campo. La Comisión del Canal de Panamá obtuvo el uso del Centro Recreativo adyacente a la escuela, que incluye las canchas de "basket". (Foto: M.A. Guerra)

Departures

- Stanley Heckadon, STRI research associate, Jul 21- Aug 1, to Florida to lecture both on Central America at the Florida Economics Club, Tallahassee, Florida and at the College of Law, University of Florida, Gainesville. Then on to Oxford, United Kingdom, to attend the first meeting of the board of trustees of the new Center for International Forestry Research (CIFOR).
- Alan Smith, to Washington, DC, Jul 28-Aug 16, for official business at the Smithsonian Institution, then to Honolulu, Hawaii, to attend the AIBS meetings.

THINGS YOU SHOULD KNOW

FY 1993 Restricted Endowment Funds

Personnel conducting scientific research in the areas that may qualify them for support in FY 1993 from the restricted endowment funds listed in the following page should submit proposals to the Director's Office no later than August 7, 1992.

Fund Name	Purpose of Request
Abbott	Investigation in biology.
Arthur	To investigate and study the sun and to fund the annual lecture on the sun.
Baird	Scientific exploration and research
Lindbergh	Conservation, aviation, and medicine.
Hodgkins	Study of atmospheric air
Nelson	Study of birds and mammals of the Americas.
Sprague	Advancement of physical sciences.
Walcott	Development and publication of geological and paleontological studies.
Walcott-Botanical	Botanical publications.

Death of Officer Marcelino Castillo

Muerte del Cabo Marcelino Castillo

Director Ira Rubinoff and all STRI personnel express their profound sorrow for the death of *Cabo* Marcelino Castillo, a member of the Panamanian forest police. Mr. Castillo tragically lost his life while patrolling the area of Gigante Peninsula with STRI gamewarden, Juan Barría. He was killed during the capture of a poacher with a record of previous captures. *Cabo* Castillo was held in high esteem by the STRI gamewarden force and STRI personnel for his sense of cooperation and responsibility. The incident is currently being investigated by the authorities.

At the time of his death, Mr. Castillo, who was 26 years old, leaves behind a wife and 3 small children. The STRI community would like to help his family with financial contributions, as they are now left in economic difficulties. All donations can be made through your facilities secretary for forwarding to his widow. Your generosity is very much appreciated.

El Director Ira Rubinoff y todo el personal de STRI expresan su más profundo pesar por la muerte del Cabo Marcelino Castillo, miembro de la Policía Forestal. El viernes 17 de julio, durante un patrullaje en el área de Gigante junto con Juan Barría, guardabosque de STRI, el Cabo Castillo murió tratando de capturar a un cazador furtivo reincidente. El Cabo Castillo demostró siempre un gran sentido de cooperación y responsabilidad, ganándose así el aprecio del cuerpo de guardabosques y del personal de STRI. El incidente está siendo investigado por las autoridades correspondientes.

Al fallecer el Sr. Castillo, quién tenía 26 años, deja una viuda y tres niños pequeños. La comunidad de STRI desea ayudar financieramente a su familia, que sufre ahora dificultades económicas. Las donaciones pueden hacerse por medio de la secretaria de su sitio de trabajo, para luego ser enviada a la Sra. Castillo. Su generosidad será muy agradecida.

Reminder from Procurement

We would like to remind you that APO mail has specific regulations that must be followed. Packages should be within the 70" limit and the 108" length plus girth, well-wrapped and with a custom declaration. Shipping must be specified: air mail, SAM, PAL, Surface Insured. Your facility secretary has a guide for military postal service. Please be advised that the correct mailing address is as follows:

For Official Mail: Smithsonian Tropical Research Institute, UNIT 0948, APO AA 34002-0948.

For Personal Mail: Smithsonian Tropical Research Institute, P. O. Box 2072, Balboa, Ancon, Panama.

It is important to remember that the APO address is to be used exclusively for official mail, which is STRI or research related business only. Improper use of the APO could result in the return to sender of mail and packages for unauthorized APO use.

Behavior Discussion Group

The Behavior Discussion Group will meet again on Tuesday, Jul 28, from 5-7 pm in the Tupper Meeting Room. Michael Ryan will report about "Maintenance of behavioral and genetic polymorphism in swordtails (*Poeciliidae*)". Prior reading: *Am. Nat.* 139: 21-31; *Behavioral Ecol. Sociobiol.* 26: 231-237. For more information please call Ursula Schober at 28-4060 or Stanley Rand at 27-6022.

ANNOUNCEMENTS

Agradecimientos

Ricardo Thompson desea dar las gracias al personal del STRI por su ayuda y apoyo en el reciente tornado, y muy especialmente a Jorge González y a Juan Campos.

At Tupper Center

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| Mon, Jul 27 | ESP Meeting, 8-11 am, Large Meeting Room. |
| Tues, Jul 28 | Behavioral Discussion Group, 5-7 pm, Large Meeting Room. |
| Fri, Jul 31 | <i>Informe del Congreso del Medio Ambiente de Brasil para PEMASKY</i> , 3:30-6 pm, Large Meeting Room. |

For Sale ••• Se Vende

- Bose 601 Speakers for sale, excellent condition, never been used, \$570 the pair. Call Marivi Walker, Naos.
- 18" Sony Color TV, cable ready, remote, unique ability to display NTSC, U.K. PAL and European PAL tapes and broadcast signals. Excellent \$120. Neal Smith, Tupper.
- Nissan March, good condition, 1987, \$2,500. Motor scooter Honda 150, \$1,300. Hector Guzman, Surfside.

RESEARCH UPDATE

African Bees

"The Accidental Experiment"

by Gretchen Sotomayor

Their reputation for colonizing the tropics rivals that of the New World explorers 500 years ago.

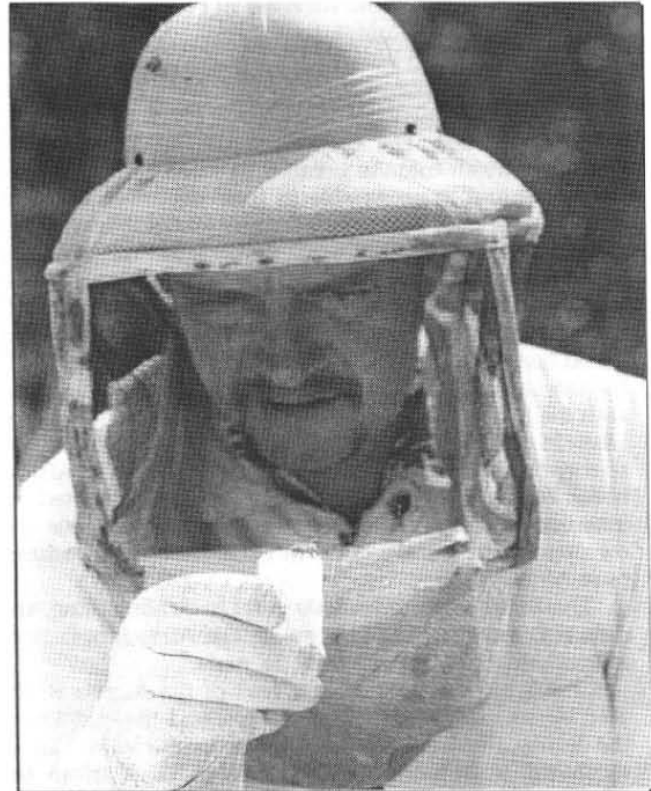
Since the introduction of wild African honeybees to southern Brazil in 1956, these aggressive, efficient and, at times, unpredictable bees have colonized some 20 million square kilometers throughout Central and South America—including the country of Panama in one year's time. They've displaced the docile European honeybee from hives in the tropical New World, killed hundreds of people with their sting and put many beekeepers out of work.

From 32 degrees south latitude to 26 degrees north latitude, the well-publicized northerly march of the "killer bees" has raised fears and questions about their effect on humans, the economy, and local floras and faunas. In Panama City at the Smithsonian Tropical Research Institute, scientist Dr. David Roubik has devoted many years of research to the study of bees—and how they interact with the ecosystem. Roubik has collected data on feral African honeybees in Panama since their arrival in 1982, in French Guiana since 1976, and Mexico since 1986. Roubik emphasizes that his research differs from most because it focuses on bees in the wild, not domesticated bees in apiaries.

The African honeybees can nest just about anywhere—in the forest, on farms, in garbage dumps and in old tires. They can be unexpectedly aggressive, may desert a hive without notice, and are very efficient in their collection of food. Each colony of wild African bees supports about 20,000 bees, and each year it collects 40 kilos of pollen and 200 kilos of nectar—food that could be used to feed other animals, such as bats, native bees and birds. Though long-term studies show some native populations are experiencing a decline in countries, such as Mexico and French Guiana, since the bees' arrival, some of Panama's local flora and fauna seem unaffected so far, Roubik said.

On Barro Colorado Island (BCI) in Lake Gatun, the only long-term study site for African bees in Panama, the African bee is thriving but the island's native bee populations have not been altered by its presence. Scientists have collected 14 years of data on the island's bee populations, including seven years of research before the African bee arrived. Roubik believes that the isolation of the 15-square-kilometer island from Panama's mainland, coupled with the bee's normal flight range of 10 kilometers from its nest, are influential factors.

"The island itself is smaller than the foraging range of the bees," Roubik said.



David Roubik

(Foto: C.C. Hansen)

However, outside of the island's unique environment, it appears that some of Panama's native bee populations are reacting to the arrival of the African honeybees. During a two-week experiment in 1984 in Soberania National Park near Panama City, Roubik noted a decrease in foraging among the native stingless honeybees. Typically, native bees collect a massive amount of food in foraging "bursts" that occur every two to three weeks. During these brief periods, the bees can collect half of their resources in only three percent of their total foraging time. Among stingless bees observed by Roubik, the foraging peaks disappeared after introduction of the African bees. Though the loss of the foraging peaks is the only sign of the African bees' effect on native populations in Panama, their presence will become more significant with time, Roubik said.

"I think that is how the African honeybee will disturb the native bee population and tropical ecology in the future," Roubik said. "Native bees are not getting as much food and their normal harvesting rhythm is destroyed."

In the beehives of Panama, the African bees brought dramatic change in a short period of time, and since their arrival a decade ago, only three of the 10 large-scale professional beekeepers remained in business.

"Those beekeepers who survived in Panama have modified their practices," Roubik said.

Before the African bees, each professional apiary supported 500 to 2,000 hives valued at \$100 each. Today, no one owns more than a couple of hundred hives, and they are valued much less. The business is also more challenging with the African colonies because they can be "explosively defensive" and unpredictable in their departure from the hive, Roubik said. Entire colonies will abscond, leaving the beekeeper with an empty hive and no business until other colonies fly in to fill the vacated hives.

Termed by Roubik as an "accidental experiment," the colonization by African bees began when 46 South African queen bees were imported to southern Brazil in 1956 with the intent of improving beekeeping by selective breeding with the European honeybees. However, the plan backfired when 26 queens escaped into the jungle, resulting in the not-so-surprising displacement of European bees by the African bees, Roubik said. The 'escapees' were augmented by intentional distribution of hybrid Africanized queens and colonies in Brazil, and within one generation, they produced pure African drones.

"The European bees had 300 years to do something, and didn't do anything," Roubik said. "The African bees came in and colonized the tropics in 34 years."

Roubik believes that a large part of the success of the wild African honeybee in the tropics, and the inability of the European honeybee to compete in the wild, can be attributed to differing foraging habits. The African bee colony places more emphasis on foraging, maintaining a continual foraging pattern even when resources are scarce. On the other hand, the European bee is structured to quickly gather large quantities of food, coinciding with the availability of the temperate zone's abundant resources in spring and summer.

"It's either all or nothing in the way that the European bees forage," he said. But to survive in the wild tropical environment, it is essential to continually forage, Roubik said. "If European bees aren't killed by predators, they starve."

In Panama and throughout Central and tropical South America, the African bees were able to colonize and dominate habitats in both the wild and domesticated bee world, Roubik said. The only surviving European honeybees in Panama live in beehives on San José Island. In the "wild" areas of Panama, which constitutes any area not within the control of a beekeeper, African bees were able to colonize due to the lack of feral honeybees. Within the apiaries, the more docile European honeybee, *Apis mellifera*, was driven out by the aggressive South African *Apis mellifera scutellata*.

Last year, Roubik worked with two University of Panama students to determine what, if any, difference existed between the bees in eastern and western Panama, and how the bees in Panama differed from the "Africanized" bees introduced to South America. The students, Víctor E. Moreno and Ovidio Durán, avoided beehives and

collected samples of wild bees only. They found no differences between the bees of eastern and western Panama, and determined that the new bees in Panama were truly "African," and showed no trace of prior interbreeding with other bees.

Though European honeybees were brought to South America some 300 years ago for honey production, the indigenous tropical stingless bees have remained the source of honey in tropical forests because of the European bees' inability to survive and reproduce in wild tropical areas, Roubik said. The only area in Central and South America where European honeybees are wild and remain dominant is in South America's cooler temperate zones in Chile and the southern regions of Argentina - one area that the African bees did not colonize. Roubik believes that the African bees avoided this area because of the successful colonization by European bees, which are essentially a temperate species of the African bees.

"You don't come in and colonize an area that is already colonized," he said.

Though some scientists believe that North America may be too cold for African bees to survive, Roubik and collaborator Ed Southwick conducted unprecedented research in 1989 on the behavior of African bees in temperatures below 16 degrees Celsius.

"What we found is that they did exactly the same thing (to survive), except that the African bee didn't do it quite as well," Roubik said. While the African and European honeybees used similar mechanisms for survival, such as forming a tight cluster to trap heat, the African bees weren't as efficient and they used more honey to keep warm. If the supply of honey needed for survival is available, about 20 kilos for the average European colony during one winter, then the African bees could probably survive, Roubik said.

However, because he believes that the African bees will not invade territory of an established colony of wild honeybees, Roubik says it's unlikely that the African bees will travel much further north into territory dominated by wild European bees. The African bees are currently in southern Texas in the United States.

"I sincerely doubt that there would be an invasion of North America," Roubik said. "They won't do well in the temperate zone because they already have competitors for food, mates and places to live" ♦

As part of the STRI-University of Panama Seminar Series, David Roubik will give a seminar on Thursday, July 30, at 5:30 p.m. in the Sala Ricardo Miró, Biblioteca Simón Bolívar, University of Panama. The title is: *El Dilema de las Abejas Africanizadas: ¿Qué Sabemos Después de Una Década de Investigaciones en Panamá?*

For transportation arrangements please contact Marissa Crespo, Office of Education.