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Smithsonian Tropical Research Institute Fact Sheet

The Smithsonian Tropical Research Institute is the world's premier tropical biology research institute, dedicated to increasing understanding of the past, present and future of tropical biodiversity and its relevance to human welfare.

STRI's focus is curiosity-driven basic research conducted primarily in tropical forest and coral reef ecosystems. STRI scientists discover new organisms, test scientific explanations for ecological adaptation and evolutionary innovation, develop methods to restore degraded lands, train students and promote conservation of tropical ecosystems.

Headquartered in the Republic of Panama, STRI provides a comprehensive tropical sciences library; a network of research stations in the American tropics and a station in Kenya protected under international treaties and equipped for sophisticated studies; and two construction-crane canopy access systems. STRI also coordinates the Center for Tropical Forest Science-Smithsonian Institution Global Earth Observatories (CTFS-SIGEO), a global network of more than 30 forest research and monitoring stations on five continents.

History

In 2010, the Smithsonian celebrates 100 years of tropical biology in Panama, commemorating the 1910 Panama Biological Survey. In 1923 entomologists working to eradicate malaria and yellow fever that had crippled French canal building efforts participated in the founding of a field station on Barro Colorado Island in the Panama Canal waterway. In 1946, BCI became a bureau of the Smithsonian dedicated to conducting long-term studies in tropical biology. The organization changed its name to the Smithsonian Tropical Research Institute in 1966 and later established field stations throughout Panama, including marine science laboratories on both coasts.

Budget and Staff

STRI's fiscal year 2009 operating budget was approximately \$28 million. Research at STRI is conducted by an international group of 35 scientists and a full-time staff of 350 employees.

Scientific Research

Tropical Diversity and Its Origins—The origin and maintenance of biodiversity is one of life's great mysteries. Insect sampling in forest canopies suggests that the total number of species on Earth is perhaps 10 million, of which only 2 million have been identified to date. Scientists know

little of their biology; yet they may harbor potential sources of new medicines, pest controls and other compounds. Panama has one of the world's best-known tropical floras, which is now being screened for biomedical compounds. Surveys of poorly-known marine groups routinely yield new species.

Marine Ecology and Evolution—STRI studies how marine organisms become genetically different with time and how they become reproductively isolated via behavioral and molecular mechanisms. The Panama Canal provides an ideal setting to study invasions by marine organisms.

Ecology and Physiology of Tropical Forests—STRI's Center for Tropical Forest Science coordinates forest ecology research sites in 20 nations, providing a "Global Observatory" fundamental to understanding how forests change through time in response to changing climate. STRI's plant physiology program reveals the myriad ways that plants respond to environmental stresses. STRI studies how plants respond to elevated concentrations of carbon dioxide, including the first large-scale study of multiple tree species in the tropics. STRI pioneered the use of construction tower cranes to explore tropical forest canopies.

Behavior and Adaptive Evolution—Successful conservation efforts depend on understanding animal behavior, such as how far a bee carries the pollen of a rare orchid or how mammals disperse seeds. STRI's new neurobiology lab allows researchers to take advantage of Panama's high insect diversity in a study aimed at understanding the links between brain miniaturization and behavior. High marine biodiversity supports studies of the connections between environment and genetically determined behaviors such as the ability to move through the water or attach to surfaces.

Archaeology, Anthropology and Human Ecology—The accumulated knowledge of tropical peoples allowed them to flourish, yet their knowledge and environments are rapidly disappearing. By studying the history and development of regional economies and social formation, STRI researchers identify marine and terrestrial conditions that lead either to the depletion of local resources or to their more sustainable use.

Paleoecology—Paleoecologists study the biological consequences of the closing of the Panamanian Isthmus, which created two marine realms and linked previously distinct floras and faunas of North and South America. Work in Colombia documents the first tropical rainforest in the region and its inhabitants, including the world's biggest snake. A century-long record of coral growth rates shows a decline due to increased sedimentation from coastal runoff: a result of massive deforestation.

Publications

STRI research is reported in more than 10,000 scientific journal articles, including many in the journals *Science* and *Nature*, as well as in numerous books and edited volumes.

Education and Public Programs

A fellowship program provides training opportunities to students worldwide, and STRI offers advanced graduate studies with affiliated institutions. A bilingual public education and outreach program interprets STRI research and promotes conservation, offering site visits, a weekly newsletter, public lectures, media releases, a nascent videoconferencing program and seminars for decision makers.