



Smithsonian  
Institution

# Spotlight on Science at the Smithsonian

Weekly Newsletter

Vol. 1, No. 11 • April 14, 2003



Eld's Deer

## Tracking the Ghost Deer

Eld's deer (*Cervus eldi*) once roamed Southeast Asia's dry forests in abundant herds of two and three hundred animals. Today, Eld's deer is among the rarest of deer species.

Diminished herds that survived World War II fell victim to the Vietnam War, because they were an easy target for hungry villagers and soldiers, armed with the guns that arrived along with the war. By the 1980s, the once-thriving herds had been reduced to thinly fragmented and semi-captive populations in India and China and scattered wild populations in Myanmar. The species was believed to have disappeared from other habitats.

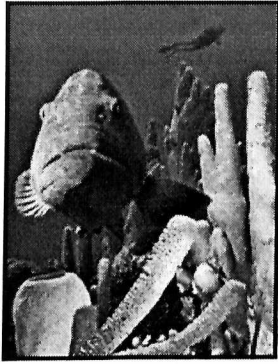
National Zoo scientists at Conservation and Research Center established the animal's husbandry requirements. They also pioneered techniques in artificial insemination and embryo transfer that ensure good genetic management well into the future.

Since 1995, National Zoo scientists have worked with park rangers in Myanmar to identify and study the last remaining Eld's deer living in the wild. A national survey taken in 1998 estimated that fewer than 1,200 deer remained in Myanmar.

In May 2002, Bill McShea, a wildlife biologist at the National Zoo, who was collaborating with the Wildlife Conservation Society (WCS), unexpectedly found Eld's deer populations in central and southern Laos, possibly of a subspecies known only in zoos. This marked the first verified population of the species found outside of Myanmar since the Vietnam War.

Based on their understanding of the deer's habitat and needs, McShea and graduate student Kevin Koy mapped potential Eld's deer habitats in Southeast Asia, trying to pinpoint where they would be likely to find the species. They found suitable habitats in northeastern Cambodia and southern Laos. Their study coincided with the return of conservation organizations to Cambodia and reports of Eld's deer sightings in northeastern Cambodia, near the border with Laos.

In April 2003, McShea returned to Laos with a team of experts from WCS, the World Wildlife Fund, and the Myanmar and Laotian governments, to develop a conservation plan for Eld's deer. They met with local villagers and officials and crafted a management plan that incorporates the needs of the villagers with the needs of the deer—a key step in any successful conservation program. A new national survey being conducted this year in Myanmar will provide more information on the status of Eld's deer populations.



SAO astronomers reviewed studies of coral, glacier ice cores, tree rings, and other indicators to trace changes in the world's climate over the past millennium.

### **The 20th Century: Maybe Not So Hot**

Smithsonian Astrophysical Observatory (SAO) solar astronomers Willie Soon and Sallie Baliunas and their colleagues have determined that the 20th century was likely neither the warmest century of the past 1,000 years, nor the century with the most extreme weather.

The scientists compiled and examined results from more than 240 research papers published by thousands of researchers over the past four decades. Their report, which will be published in the Volume 14 issue of *Energy and Environment*, provides a detailed look at climate changes that occurred in different regions around the world over the last 1,000 years.

Their work confirms that the Medieval Warm Period of 800 to 1300 A.D. and the Little Ice Age of 1300 to 1900 A.D. were worldwide phenomena, not limited to the Europe and North America. For a long time, researchers have had anecdotal evidence supporting the existence of these climate extremes. For example, the Vikings established colonies in Greenland at the beginning of the second millennium that died out several hundred years later when the climate turned colder. And in England, vineyards flourished during the medieval warmth. The authors say they now have an accumulation of objective data to back up these cultural indicators.



Species of *Clusia* that occurs in the Panama Canal Watershed.

### **Unraveling Clues about *Clusia***

*Clusia*, is a group of tropical woody plants, represents a great diversity of life forms that grow in a wide range of habitats. Until recently, its taxonomy has been notoriously difficult to study: flowers are present for only short periods and don't retain their character well in herbarium collections, and morphological distinctions based on fruit and vegetative materials can be ambiguous.

With the help of recent advances in the use of molecular phylogenetic techniques, plant physiologists are beginning to solve some uncertainties. Klaus Winter, director of the Smithsonian Tropical Research Institute's (STRI's) Plant Physiology Project, STRI fellow Hans Gehrig, and collaborators from STRI, the University of Nevada, and the Missouri Botanical Garden published an article on Panamanian *Clusia* in the April issue of *Plant Biology*.

Because increased sample size was necessary to unravel the phylogenetic relationships within *Clusia*, they collected plant material from 31 of the approximately 40 species of *Clusia* known to occur in Panama. At STRI, the scientists extracted total DNA from the species and sequenced them. They concluded that genetic sequences are useful markers for a phylogenetic interpretation of *Clusia* species. Future studies should provide information for resolving relationships among subspecies.

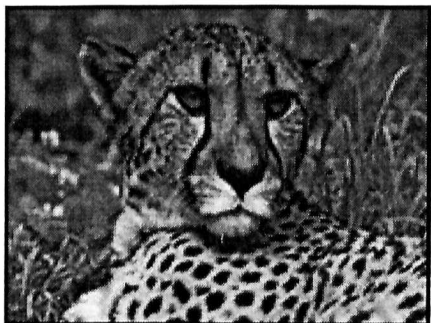
### **Caribbean Waters Hold Promise for Wonder Drugs**

Researchers working with the Panama International Collaborative Biodiversity Groups (ICBG) have identified elements in Caribbean coral that strongly

resist one of the parasites that causes malaria.

Using a novel biological assay developed in the laboratory of ICBG participant Eduardo Ortega that detects antimalarial activity, STRI research associate Todd Capson and Abimael Rodrigues of the University of Puerto Rico isolated the active antimalarial components from the Gorgonian coral, *Briareum polyanthes*, collected by scuba divers near Cabo Rojo, Puerto Rico. Their contribution showed that the substances have activity against the parasite that causes malaria. An article documenting their work was published in the *Journal of Natural Products*.

Supported by the National Science Foundation, the National Institutes of Health, and the U.S. Department of Agriculture, ICBG researchers test plants and marine organisms for chemical compounds that may prove to be useful treatments against cancer, HIV, malaria, leishmaniasis, and American trypanosomiasis.



### **The Cheetah Challenge**

Captive cheetah populations worldwide are in precipitous decline. In U.S. zoos alone, they are decreasing by about 5 percent a year.

Among the reasons for this dramatic decrease is the problem of mate incompatibility. Small zoos don't offer cheetahs a wide choice of sexual partners. Also leukoencephalopathy, a new neurological disease, has caused 66 cheetah deaths in North America since 1996.

The continuing decline of wild cheetah populations accentuates the gravity of the situation. Captive cheetahs provide an important insurance policy for

the genes of wild cheetahs. They also serve as a research resource for scholarly studies that cannot be conducted in nature on this elusive creature, yet have application to conserving wild populations.

David Wildt, Senior Scientist at the National Zoological Park (NZIP), recently participated in a cheetah management workshop with experts from North America, Europe, and South Africa. They agreed that without immediate and coordinated action, captive cheetahs will become extinct.

To reverse this trend, workshop participants drafted a plan for developing several regional breeding centers, including at least one in the U.S. Placing more cheetahs in a single location should increase the chances of successful reproduction, enhance research opportunities, and reduce the risk of disease transmission

The centers would be responsible for managing cheetah reproduction, from breeding through offspring development. Because of their expertise in and success with artificial insemination—including using semen imported from wild cheetahs in Africa—NZIP scientists would be involved in these breeding centers.



**This is the famous "Big Tree" on Barro Colorado Island.**

### **Big Questions about Big Trees**

Large stores of carbon in tropical forests play a major role in the global carbon cycle. However, the questions of whether old-growth tropical forests represent a net sink of atmospheric carbon and how they will respond to future climate changes are still largely unresolved.

On Barro Colorado Island (BCI), a Smithsonian research reserve, scientists Richard Condit and Stephen Hubbell, from STRI's Center for Tropical Forest Science, former STRI scientist Robin Foster (now at Chicago's Field Museum of Natural History), and other collaborators from STRI and the Centre National de la Recherche Scientifique in Toulouse, France, recently tested whether above-ground biomass on BCI is increasing due to climate change.

Their findings bring into question the hypothesis that tropical forests are a net carbon sink, but don't exclude this possibility, especially because the below-ground carbon cycle is poorly known. They point to the need for field censuses that are carefully designed to test the net carbon sink hypothesis.

Appearing in the April issue of the *Journal of Ecology*, their work has important implications for the response of an ecosystem to increased levels of CO<sub>2</sub>. Indeed, small trees may respond faster to CO<sub>2</sub> changes than large trees. Unfortunately, very few studies have examined the long-term dynamics of saplings in rainforest understory.

### Recent Publications

Capson, T.; Ortega-Barria, E.; Roriguez, A.; Ospina, C. 2003. "Briarellins J-P and Polyanthellin A: New Eunicellin-Based Diterpenes from the Gorgonian Coral *Briareum polanthes* and Their Antimalarial Activity," *Journal of Natural Products*, 66:357-363.

Chave, J.; Condit, R.; Lao, S.; Caspersen, J.; Foster, R.; Hubbell, S. 2003. "Spatial and temporal variation of biomass in a tropical forest: results from a large census plot in Panama," *Journal of Ecology*, 91:240-252.

Winter, K.; Hammell, B.; Cushman, J.; Virgo, A.; Cushman, M.; Gehrig, H. 2003. "Cladogram of Panamanian *Clusia* Based on Nuclear DNA: Implications for the Origins of Crassulacean Acid Metabolism," *Plant Biology*, 5: 59-70.

O'Neal, L. 2003. "Panama Canal Island a Paradise for Tropical Research," *National Geographic News*, April 24, 2003.

Soon, W.; Baliunas, S.; Idso, C.; Idso, S.; Legates, D. 2003. "Reconstructing climatic and environmental changes of the past 1000 years: a reappraisal," *Energy and Environment Journal*, 14: 2&3; 233-296.

Soon, W., Baliunas, S. 2003. "Proxy climatic and environmental changes of the past 1000 years," *Journal of Climate Research*, 23: 89-110.

### Web Links

*Lewis and Clark* lets you follow the Lewis and Clark trail, and discover the flora and fauna as they described it along the way.

*Amazon Conservation* uses the tools of GIS (Geographic Information Systems) to create an interactive, web-based resource to display maps of the Amazon basin with overlapping layers of conservation activity (protected areas, national parks, etc.).

### Spotlight on Science at the Smithsonian

*Spotlight on Science at the Smithsonian* is a weekly electronic newsletter about Science at the Smithsonian. It is produced for the Smithsonian community by the Office of the Under Secretary for Science. To contact the editor, e-mail [mellendickt@si.edu](mailto:mellendickt@si.edu).

David L. Evans.....Under Secretary for Science  
Theresa L. Mellendick.....Editor

[www.si.edu/research/spotlight](http://www.si.edu/research/spotlight)