



Artist's depiction of "Goya".

Presenting Goya-zilla—The World's Largest Rodent

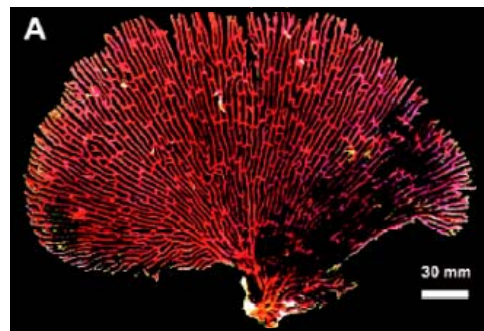
A research team led by Smithsonian Tropical Research Institute (STRI) research associate Orangel Aguilera has found and classified the fossil of the world's largest rodent. Roughly the size of a buffalo, this evolutionary sibling to modern-day guinea pigs roamed the banks of an ancient Venezuelan river some 8 million years ago.

Dubbed "Goya," the 90 percent complete fossil was trapped within sedimentary layers of brown shales and coal in the Urumaco Formation, 402 kilometers west of Caracas. *Phoberomys pattersoni* weighed about 700 kilograms and was about 2.7 meters long and 1.28 meters tall. It had long teeth, revealing an abrasive diet, perhaps of grasses from brackish water. Like a guinea pig, its hindquarters and rear legs were much larger and more powerful than its smaller forelimbs, but today's rodents only range from 200 grams to 50 kilograms.

The ancient creature's remains offer rare, tantalizing new clues to the Upper Miocene period in northwestern Venezuela. Discovered in a now arid region,

the fossil and associated plant evidence suggest a lush, tropical landscape, rich with super-sized turtles, catfish, and crocodiles. The researchers' findings, published in the September 16 issue of *Science*, seem to reinforce the theory that a massive river called the Paleo-Orinoco-Amazon once flowed parallel to the Andes mountain range through Urumaco, in the Falcon State, northeast to the Caribbean Sea.

Andrew Sugden, a biology expert and *Science International's* Managing Editor, described the research as a milestone within the field. Until the emergence of the Panamanian isthmus connecting Central and South America some 3 million years ago, South America had been an island for tens of millions of years. South American animals thus managed to evolve in relative isolation, and the continent became home to giant representatives of a number of mammalian groups, some of which survived until the arrival of humans.

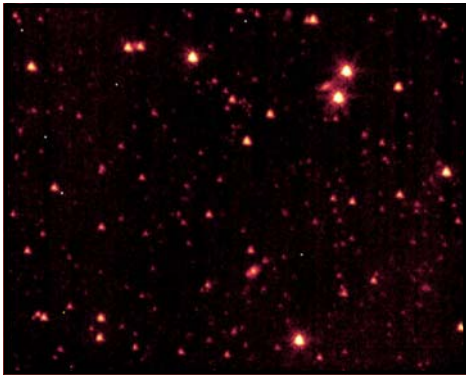


Paciforgia tupperi.

Scientists Discover New Coral Reef Species

STRI marine biologist Héctor M. Guzmán and colleague Odalisca Breedy from the University of Costa Rica recently completed an unprecedented survey of the species composition and geographic distribution of the coral reefs off Costa Rica. The results of their

research on species of the genus *Pacifigorgia* were recently published in *Zootaxa*. In their article, the scientists present identifications, descriptions, and detailed color illustrations of four known species and nine newly discovered species. They named one of the new species, *Pacifigorgia cairnsi*, in honor of Stephen Cairns of National Museum of Natural History, for his encouragement during the project. And they named another, *Pacifigorgia tupperi*, after Mark Tupper, in recognition of his interest and valuable collaboration in the development of marine science in the tropics.



SIRTF "Aliveness Test" Image of a Field Stars.

The First Infrared Picture from SIRTF

Following NASA Administrator Sean O'Keefe's testimony before Congress, NASA released the first picture taken by SIRTF (the Space Infrared Telescope Facility). The released image was taken by IRAC, the Infrared Array Camera, onboard. SAO astronomer Giovanni Fazio, the Principle Investigator of IRAC, leads a team of astronomers from SAO and other institutions including the University of Rochester, NASA's Goddard Space Flight Center and Ames Research Center, and the University of Arizona. IRAC, one of three SIRTF instruments, will take dramatic, four-color infrared images of regions of space which are dust-obscured and therefore invisible even to the Hubble Space Telescope. IRAC is hundreds of times more sensitive than any previous astronomical infrared camera and over a thousand times more sensitive than NASA's previous infrared space telescope. SIRTF was the highest priority recommendation of the National Research Council's "Decadal Report" issued in 1991.

The released image was not part of any scientific program, but instead was simply the first test of IRAC's "aliveness." SIRTF was launched on 25 August, and the telescope opened to light on 30 August. On 1 September, as part of the methodical process of gradually turning on and testing all of SIRTF's numerous components, IRAC was powered on -- more than a full month before the telescope is even expected to reach its nominal operating temperature and focus and begin its scientific measurements. The remarkable result of this engineering step was a deep image, taken in less than two minutes, of stars and galaxies in the direction of the constellation of Perseus, most of which have never before been seen at this infrared wavelength (although most are known from optical studies). NASA took the unusual step of releasing this engineering image to dramatize the amazing and rapid first success of this long-awaited "Great Observatory." Many more critical and challenging engineering tests remain before SIRTF begins routine scientific research from space.



On the left unprocessed beard of byssus (dry state), Algiers. On the right, z-twist-spun single yarn of byssus, Italy, 1965.

Using Historical Textiles to Create Biodegradable Fibers

For centuries, the byssus fiber from *Pinna nobilis* Linné was used as a substitute for silk. Samples of yarn made from this byssus fiber, as well as of the raw fiber itself, were brought for analysis to Smithsonian Center for Materials Research and Education (SCMRE) by Cheryl Bright, collections manager, and Tyjuana Nickens of Invertebrate Zoology at the National Museum of Natural History (NMNH). They met with members of the SCMRE Microscopists' Group to discuss such questions as the by-

sus fiber's amino acid content compared to that of silk, and its survival in the marine environment and on land.

How the byssus fiber survives may relate to the engineering of polymers and textiles designed specifically for marine applications.

With the intention of transferring experience in preservation and biodeterioration to both past and future materials, Mary Ballard of SCMRE and colleagues at work on textiles from the recently recovered SS *Hunley* submarine recovery recently submitted a project proposal to the National Textile Center, entitled "Connecting Historical Textiles with Future Biodegradable Fibers."



Mexican wolf drinking from a pool of water.

National Zoo Recognized for Conservation Efforts

The American Zoo and Aquarium Association (AZA) presented its annual award for Significant Achievement in North American Conservation to the Smithsonian's National Zoo and 14 other accredited zoos that cooperatively participate in the Mexican Gray Wolf Recovery Program. This species once inhabited in the mountainous regions of the Southwest, from central Mexico through portions of southern Arizona, New Mexico, and Texas. Missing from the landscape for the last half of this century, the Mexican gray wolf's howl can again be heard, thanks to the recovery program's efforts.

Between 1977 and 1980, five Mexican wolves were removed from the wild, including a pregnant female.

From these few animals, a captive breeding program was developed to produce wolves for re-establishment in the wild. In 1993, the AZA instituted a Species Survival Plan for the Mexican wolf to maintain the genetic diversity of the animals in captivity, and in 1995 two additional lineages from captive animals (residing in zoos and breeding facilities since the 1960s) were added to the breeding program. With the 1998 release of captive wolves into Arizona's Apache National Forest, the Mexican wolf took an important step forward in returning to its former role as the top predator in southwestern ecosystems.

In July 2001, the National Zoo welcomed three sibling males to a newly renovated exhibit approved by both the U.S. Fish and Wildlife Service and the AZA Species Survival Plan management group. The three Mexican gray wolves are being held as a nonbreeding group, as called for in the Species Survival Plan. In the future, one or more of the wolves may be paired with a female at another zoo, or the management group may send a female to the Zoo to initiate a breeding program there.

The captive community maintains over 260 Mexican gray wolves in facilities throughout the United States and Mexico. Participants are an active and integral part of the recovery effort—through their wolves released, the education and advocacy programs they support, and the time and money that they contribute to conservation initiatives on behalf of this rare wolf. Today there may be as many as 60 free-ranging wild wolves, many of them wild-born offspring of wolves contributed by AZA institutions. The goal is to re-establish by 2005 about 100 wolves in the Blue Range Wolf Recovery Area in Arizona and New Mexico.

Recent Publications

Breedy, O.; and Guzman, H. 2003. "Octocorals from Costa Rica: The genus *Pacificorgia* *Coelenterata*: *Octocorallia*: *Gorgoniidae*." *Zootaxa* 281:160.

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O'Dea, A. 2003. "Seasonality and zooid size variation in Panamanian encrusting bryozoans," *Journal of the Marine Biological Association*, 83: 1107-1108.

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Takeda, S.; and Murai, M. 2003. "Morphological and behavioural adaptations to the rocky substrate by the fiddler crab *Uca panamensis* (Stimpson, 1859): Preference for feeding substratum and feeding mechanism." *Journal of Experimental Marine Biology and Ecology*, 287(2): 179-191.

Web Links

Learn about what Smithsonian Environmental Research Center is doing to help educate students in aquatic research in the [STAR Program](#).

Spotlight on Science at the Smithsonian

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