

Plants Poised at Extinction's Edge

Botanists polled in a new survey predict that 680 native U.S. plants may become extinct before the year 2000, representing "clearly the most catastrophic loss of species in evolutionary time," says Donald Falk, director of the nonprofit Center for Plant Conservation, which conducted the study.

The findings highlight the increasing rate of plant extinction in the United States. While the fossil record indicates a natural extinction rate of one plant species per several hundred to 1,000 years, the rate during the last two centuries has increased to about one per year, according to Falk. The survey results, announced this week at a Smithsonian Institution news conference in Washington, D.C., "surprised even us," Falk says.



Texas bladderpod, Lesquerella pallida, is a potential source of seed oil but may soon become extinct.

CPC

Since 1974, when the first survey to identify threatened U.S. plants was completed, scientists have considered about 3,000 of the more than 25,000 native plant species to be at some risk of extinction. But until now they had no reliable estimate of when these species are likely to vanish, Falk says. "Our purpose was to clarify the extreme end of that spectrum," Falk told SCIENCE NEWS. "We'll use these data to set priorities for conservation efforts."

Beginning in 1987, the Boston-based Center asked botanists from around the United States to predict, from a list of more than 800 rare plants or from their own knowledge, species that could be extinct within five, 10 or more years. The 89 respondents placed 253 species in the five-year and 427 in the 10-year categories.

Nearly three-fourths of the 680 imminently endangered plants grow in five states or territories — Hawaii, California, Texas, Florida and Puerto Rico — all biologically diverse regions undergoing rapid population growth and extensive land development. However, it is unclear how much of the species decline is natural and how much is caused by human intervention, Falk says.

Scientists have been researching some of the imminently endangered species as possible food or technological resources. For example, several (of the genus *Lesquerella*) contain seed oils, used as high-quality lubricants in the electronics industry. Others have large tubers and so

could be edible. In addition, many are relatives of important agricultural products and could represent the only sources of material for genetic crosses or genetic engineering to breed plants for special characteristics, according to the Center's Linda McMahan.

Although the U.S. extinction problem is serious, it is small compared with species destruction in tropical rain forests. Con-

ference panelists say the U.S. endangered plants can be rescued. Falk and McMahan suggest increased efforts by government and private groups to legally protect plants, conserve habitats, study endangered plants in these habitats, collect seeds and educate the public. The Center cultivates rare plants in its nationwide network of 19 botanical gardens.

— I. Wickelgren

Ancient human ancestors got all fired up

The earliest direct evidence of fire use, in the form of charred animal bones dating to between 1 million and 1.5 million years ago, has been uncovered in a South African cave, report two anthropologists in the Dec. 1 NATURE.

The cave also contains animal bones with cut marks suggesting butchery, but whether early hominids — members of the evolutionary family that includes modern humans — used fire for cooking, protection from predators or warmth remains unclear, say C.K. Brain of the Transvaal Museum in Pretoria and Andrew Sillen of the University of Cape Town, both in South Africa.

"We now know that fire was repeatedly used at Swartkrans by early hominids," Brain told SCIENCE NEWS. Since previous excavations in the cave complex unearthed the remains of hominids killed by large cats, such as the saber-toothed tiger, he suggests the initial purpose of building fires was to keep these predators away at night.

The Swartkrans evidence appears more conclusive than a 1981 report of fire use by hominids at a 1.4-million-year-old site in Kenya. Archaeologist John A.J. Gowlett of the University of Liverpool, England, and his co-workers found magnetic changes in pieces of charred clay probably caused by a fire. This charring, however, might have resulted from a natural brushfire, not an ancient campfire.

Prior to the South African discovery, the earliest direct evidence for the controlled use of fire occurred at a Chinese site dating back nearly 500,000 years.

From more than 59,000 fossil fragments unearthed at Swartkrans, Brain and Sillen identified 270 burnt pieces. The fragments came from numerous layers of one level of the cave that is at least 1 million years old, but not from two older levels dating to about 1.8 million years ago.

Researchers compared chemical and microscopic analyses of the fossils to data from the leg bone of a modern South African hartebeest burned in a campfire. The fire was made with branches of white

stinkwood, a tree common around Swartkrans. Bits of stinkwood are in the fossil deposits.

The anthropologists say the fossil bones burned at temperatures between 200°C and 800°C, an estimate consistent with temperatures of experimental campfires made from white stinkwood.

"This is very convincing evidence for fire use by early hominids," says anatomist Pat Shipman of Johns Hopkins University School of Medicine in Baltimore, who has seen the Swartkrans remains. "If the control of fire goes back somewhere between 1 million and 1.5 million years, it would have opened up the night to a new spectrum of activities."

Only the remains of *Australopithecus robustus*, which belonged to a small-brained line of hominids that became extinct around 1 million years ago, have been found in the Swartkrans level containing the burnt bones. But Shipman and Brain, as well as Gowlett, say *Homo erectus* most likely made the fires in the cave. The larger-brained *H. erectus*, a direct ancestor of modern humans, lived from about 1.6 million to 300,000 years ago and its remains appear in other Swartkrans deposits.

"Given the evidence, we need to rethink a lot of things about early hominids," Shipman says.

For instance, the Swartkrans campfires date considerably before *H. erectus* finds outside of Africa, thus throwing doubt on the theory that the taming of fire was a key factor in the northward migration of *H. erectus*.

In addition, Shipman notes, hominids could have warded off nighttime predators from animal carcasses with the help of campfires. Previous estimates of meat eating among early hominids may be conservative, she says.

Although two of the burnt bones at Swartkrans are finger bones of *A. robustus*, they were probably part of debris left on the cave floor, Brain says. "It's tempting to think *robustus* was included in cooking, but evidence [for that conclusion] is slim." — B. Bower