# Ancient Crocodile Chomped on Plants

One look at the sharp teeth and powerful jaws of a crocodile leaves no doubt about its reputation as a ferocious meat-eater. But a surprising new discovery shows that long ago, crocodiles had at least one relative that preferred to munch on plants.

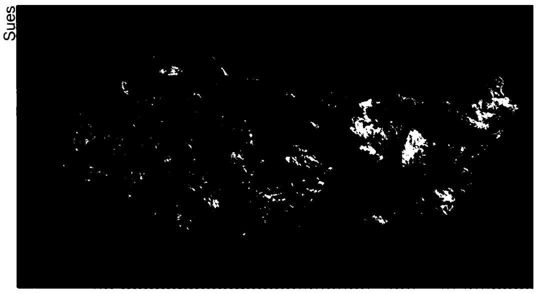
Paleontologists recently recovered the 120-million-year-old skeleton of a plant-eating crocodile from a site in the Hubei province of central China. Dubbed *Chimaerasuchus paradoxus*, it is the first example of an herbivorous crocodile ever found.

The finding alters conventional crocodile wisdom because it tells scientists that these reptiles were much more diverse than previously assumed. "Part of the appeal of this find is that it really pushes the whole realm—the ecological spectrum—of crocodilians into a new dimension," says Hans-Dieter Sues of the Royal Ontario Museum in Toronto and the University of Toronto.

Moreover, the discovery supports the increasingly popular idea that animals alive during the Cretaceous period may not have been as geographically restricted as previously thought. "According to a consensus in recent years," Sues says, "people thought that during the Cretaceous, we really had a differentiation into northern and southern faunas." Although *Chimaerasuchus* lived in the Northern Hemisphere, it appears closely related to crocodiles that lived in Gondwana, a large, ancient land mass in the Southern Hemisphere.

Sues and his colleagues Xiao-chun Wu and Ailing Sun, both of the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing, report their findings in the Aug. 24 NATURE.

Sues



*Snout of the plant-eating crocodile,* Chimaerasuchus paradoxus.

Initially, looking at the skull alone, the researchers were unsure what they were dealing with. "It wasn't quite right for any kind of early mammal or advanced reptile," Sues says. "But then, once we looked at the rest...it was clear that we were dealing with a crocodilian." The partial skeleton includes a snout, lower jaw, shoulder girdle, 15 vertebrae, forelegs, a "hand," pelvis, and thighbone—enough to give the researchers a good picture of the animal.

With slender legs and an erect posture, *Chimaerasuchus* was about 3 to 3.5 feet long. Its nose openings pointed forward, unlike all other known crocodiles whose nose openings point upward to give them their familiar profile in the water.

Its teeth tipped off the researchers to this reptile's vegetarian bent. In contrast to the cone-shaped teeth of its kin, *Chimaerasuchus'* teeth were relatively flat with a pronounced cutting edge at the back. "The teeth are specialized for dealing with highly fibrous material," Sues explains. "In fact, the teeth are extremely similar to those of certain mammals and certain very advanced mammal-like reptiles."

The *Chimaerasuchus* fossil looked so bizarre that it spent roughly three decades in limbo before anyone even identified it as a crocodile. A Chinese petroleum and geology survey, which unearthed the skeleton in the 1960s, turned it over to the institute in Beijing. The skeleton, Sues says, then "went on a lengthy odyssey in the institute." Because of its very unusual teeth, researchers had "thought that this was some kind of peculiar Mesozoic mammal."

Sues received the fossil only about three years ago. His group is currently assembling a detailed description of the reptile's anatomy. Now that *Chimaerasuchus* has found its place in the paleontological record, the phrase "herbivorous crocodile" is no longer an oxymoron. *—C. Wu*

## Finding the gene for a female attack

**For more than 40 years, scientists have known that men and women are not created equal—immunologically speaking, that is.**

**Whether one views it as females attacking males or as a biological favoritism toward men, the fact is that men's bodies accept donor organs from women while women's bodies reject organs from men. Scientists speculated that a male specific antigen—a protein that exists in all cells of a man's body, but in none of a woman's—caused this incompatibility.**

**Over the years, however, this putative protein—designated the H-Y antigen—remained elusive. A team of researchers from Britain, the United States, and France now reports finding the gene for it on the Y chromosome. "The finding allows us to examine for the first time this male-female difference," says study collaborator Colin E. Bishop at Baylor College of Medicine in Houston.**

**Scientists first found evidence for the H-Y antigen when they transplanted skin between members of a highly inbred strain of laboratory mice. Apart from every males' distinctive Y chromosome, mice of both sexes were genetically identical. Males accepted transplanted skin from both males and females, but the females' immune systems slowly geared up to reject transplants from males.**

**Except for identical twins, humans aren't genetic duplicates so physicians prescribe drugs to stop any tissue differences from causing rejection. As a result, women's bodies accept donor organs from men.**

**Although drugs prevent transplant rejections, researchers still didn't know which gene was responsible for the H-Y antigen or how this protein acted.**

**In the Aug. 24 NATURE, the international team now reports finding on the short arm of the Y chromosome a gene called *Smcy*—one that functions in every male cell. This gene has a counterpart, *Smcx*, on the X chromosome, but researchers found that proteins produced by the two genes contain different versions of an eight-amino-acid string, or peptide. And they showed the male version could trigger the H-Y antigen rejection in female cells.**

**"This gene [*Smcy*] is conserved in humans, marsupials and mice—really in everything except cattle so far," says Bishop. Because all males have both X and Y chromosomes, the presence of *Smcx* helps explain why males don't reject female organs: They won't reject a protein their own bodies make.**

**Though the protein that the *Smcy* gene codes for appears to resemble one that turns other genes on, its exact function remains a mystery, Bishop notes. The researchers are looking into the gene's role in forming sperm.**

**Harald von Boehmer of the Basel Institute for Immunology in Switzerland writes in an accompanying article that, with current tools, the gene's function is unlikely to elude researchers for long and points out that this gene may play important roles during very early development.** ***—L. Seachrist***