Higher Primates May Have Asian Root

Researchers working in southern Asia have discovered 40-million-year-old fossil teeth and jaw fragments that, in their view, support the controversial notion that anthropoids originated in Asia.

The find in Myanmar represents a new species, *Bahinia pondaungensis*, in the anthropoid group, which includes monkeys, apes, and humans, reports a team led by anthropologist Jean-Jacques Jaeger of Université Montpellier-II in France. The teeth show key similarities to those of *Eosimias*, a 45-million-year-old fossil creature from China that may also have been an early anthropoid (SN: 11/11/95, p. 309).

"The *Bahinia* find tells us that there was a complex community of primates living in Asia, with a tremendous anthropoid radiation much earlier than [many scientists] thought," Jaeger holds.

As with the Chinese material, however, classifying *Bahinia* as an anthropoid proves controversial. Critics say that Jaeger's group lacks sufficient skeletal evidence to justify its conclusion.

In contrast to the recent Asian finds, excavations over the past 40 years in Africa—especially at a rich Egyptian site—have uncovered extensive evidence of anthropoids dating to 36 million years ago (SN: 7/1/95, p. 6). Africa, the birthplace of the human evolutionary family, has received much mention as the possible ancestral home of anthropoids.

Jaeger and his coworkers view their new find as evidence for a much earlier origin of anthropoids in Asia, perhaps 55 million to 60 million years ago. In November 1998, the researchers recovered two fragmentary upper jaws and a broken lower jaw, each retaining a number of teeth, belonging to *Bahinia*. The same excavation level yielded the lower jaw of a previously identified species known as *Amphipithecus*. Jaeger's group views *Amphipithecus* as a more anatomically advanced anthropoid that lived at the same time as *Bahinia*.

Bahinia's teeth exhibit a unique combination of anthropoid features along with traits of more primitive, tarsierlike primates from nearly 60 million years ago, the researchers report in the Oct. 15 Science. Compared with *Amphipithecus*, *Bahinia* resembles a "living fossil," they contend.

Bahinia's teeth look enough like those of *Eosimias*, to place both creatures in the same evolutionary family, which may have been a sister group of the family that includes *Amphipithecus*, Jaeger's group says.

Bahinia's dental anatomy adds further support to the view that Asian anthropoids developed from creatures related to modern tarsiers, the team adds.

"The *Bahinia* fossil is closely related to *Eosimias*," comments paleontologist K. Christopher Beard of the Carnegie Museum of Natural History in Pittsburgh. "This reinforces the view that anthropoids originated in Asia." Beard directs ongoing excavations of *Eosimias* remains in China.

Elwyn L. Simons, an anthropologist at Duke University in Durham, N.C., views such assertions as premature. "Neither the *Bahinia* nor the *Eosimias* finds are complete enough to show critical anatomical features of anthropoids," says Simons, who directs primate excavations at an Egyptian site. "The case for anthropoid origins in Asia is as shaky as ever."

For instance, because no skulls are available for the Asian creatures, it's impossible to know if they had a fused forehead bone and a closed bony plate in the eye sockets, features characteristic of all anthropoids, Simons holds. The same anatomical uncertainties apply to *Amphipithecus*, he adds.

Beard and his coworkers, however, have discovered fossil limb bones from *Eosimias*, including parts of the lower leg and ankle, that, they argue, exhibit features found only in anthropoids.

Even if further discoveries confirm the anthropoid status of the Asian creatures, Simons remarks, no fossil evidence indicates that anthropoids later spread through Asia and founded African populations. —*B. Bower*

Monkeyflowers hint at evolutionary leaps

A study of the allure of monkeyflowers to pollinators challenges the long-held wisdom that evolution minces along in baby steps, according to Seattle botanists.

A small bit of the genome, possibly one gene, pumps up nectar flow enough to double hummingbird visits, report Douglas W. Schemske and H.D. Bradshaw Jr. of the University of Washington. Another small bit changes pigments so much that bee visits drop 80 percent, the researchers say in the Oct. 12 Proceedings of the National Academy of Sciences.

Genetic tweaks causing big changes buttress recent proposals that evolution can take giant steps, Schemske argues. "Adaptations are not simple, but they may not be nearly as complex as we previously thought," he says.

The earlier view held that a mutation causing a huge change typically proved too disruptive to last, so evolution more likely proceeded by many small genetic changes. However, researchers have rarely tested the idea, Schemske observes.

The alternative giant-step scenario would apply when a species faces catastrophe, such as destruction of its pollinator, Schemske explains. A gene causing a big enough difference to attract substitutes would indeed be a boon.

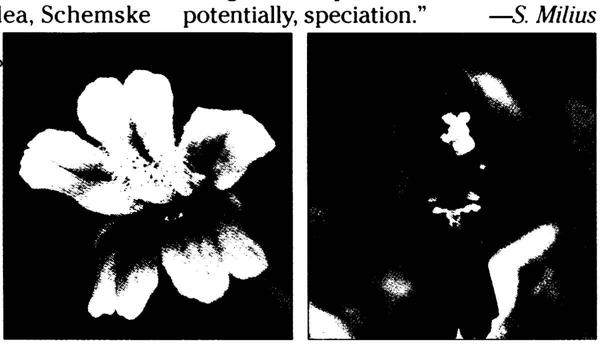
To test the impact of genetic changes, Schemske's team created two generations of hybrids, jumbling the traits of the parents: red *Mimulus cardinalis,* a hummingbird favorite, and pink *Mimulus lewisii*, which is pollinated by bees.

For a field test, researchers filled two 24-foot trucks with more than 200 plants and drove from Washington to California's Yosemite National Park. The trucks weren't air-conditioned, so the caravan traveled at night. After placing plants in a giant grid, researchers raced after pollinators and muttered into a tape recorder the ID number of each plant visited. "It was something else," sighs Schemske.

By linking pollinator interest with plant traits—pigments, nectar volume, and floral-display size—and with genetic markers, the researchers found sections of chromosomes with big effects.

The most impressive finding, says Barbara Anna Schaal of Washington University in St. Louis, is that "relatively few genetic changes are necessary to bring about reproductive isolation and, potentially, speciation." —*S. Milius*

Jordan Rehm/U. Washington



Parent species: Mimulus lewisii *(left) attracts bumblebees, but close kin* Mimulus cardinalis *(right) interests hummingbirds.*