

Second Group of Living Fossils Reported

A second population of one of the most sought-after fish on the planet, the coelacanth, has turned up because a honeymooning reef ecologist got out of a taxi at the right moment.

Mark V. Erdmann, a University of California, Berkeley biologist working in Indonesia, spotted a dead coelacanth on a handcart as he and his bride arrived at a fish market a year ago. Another catch this July, as well as local lore, convinced Erdmann that the Indonesian island of Manado Tua has living fossils in its reefs. If genetic analysis and further exploring prove him right, Indonesian coelacanths will complement the only ones previously known, a group living in waters outside Africa's Comoro Archipelago, 10,000 kilometers west.

The notion that coelacanths survive in

just two groups so far apart strikes Erdmann as unlikely, and he hopes for more discoveries. "This should be welcome news for coelacanth conservation," Erdmann and his colleagues write in the Sept. 24 *NATURE*.

The news shouldn't be too welcome, though, cautions coauthor Roy L. Caldwell, also from Berkeley. Sightings have been so rare that he can't believe the fish is common. "The worst possible thing that could happen is if people make that assumption and the interest in protecting the Comoro population decreased," he says.

That's worrisome, agrees Hans Fricke, a coelacanth specialist at the Max Planck Institute for Behavioral Physiology in Seewiesen, Germany. "I feel deep sadness for the Comorans," Fricke says. "They



A 64-pound coelacanth caught in Indonesia suggests an unrecorded population.

were very proud to be the only ones on Earth to have this fish."

Fricke takes seriously the evidence for a second coelacanth homeland. Neither storms nor currents could sweep the African fish as far as Indonesia, he says. "I'm convinced that this is a new population."

That conclusion seems reasonable to David L.G. Noakes, who studies coelacanths at the University of Guelph in Ontario. He frets about the potential for a black market, even though an international treaty protects the fish. "You can't do much with it other than hide it under the bed," Noakes fumes. He also fiercely condemns a myth that the fish's notochord fluid brings eternal life.

Coelacanths are interesting in their own right, he says. Their fins move like the limbs of animals walking on land, and they are cousins to lungfish, the oldest living relatives of tetrapods. Also, coelacanths bear live young. Inside the female, the eggs are "big as a grapefruit, the largest in any animal," Noakes reports.

Until 1938, scientists knew coelacanths only from fossils, which petered out some 80 million years ago. Then a trawler brought a living specimen up off South Africa, sparking fevered searching. Jacques Cousteau failed to find one, and Japan's Toiba Aquarium spent millions to no avail.

Erdmann followed the dramas avidly as a boy but hadn't kept up, so he didn't know whether scientists had reported an Indonesian population. "Probably the stupidest thing I ever did was not buy that fish," he says.

Erdmann did take a few pictures. Only when he showed them to Caldwell did he learn the importance of the fish he let get away. Erdmann spent almost a year interviewing fishermen before a crew brought him another coelacanth, feebly alive. None had ever survived capture, so he and his wife put the fish back into the water and donned scuba gear to accompany it on its slow, final swim. He says, "That was a magical experience." —S. Milius

Gene differs in early birds and night owls

Some people jump out of bed the minute the alarm sounds or, even more annoying to fans of the snooze button, are already up and exercising, making breakfast, or working. They're the morning people, a perplexing mystery to the night owls, who may not hit their stride until the 11 p.m. news ends.

A team of scientists now suggests that this behavioral split stems, at least in part, from differences in one of the genes that run the body's biological clock, the internal timepiece that helps determine when people feel like sleeping, eating, and performing other activities. In the Sept. 15 *SLEEP*, the group reports that people who prefer mornings tend to have one version of the gene, while more evening-oriented folks usually have another.

Investigators have recently begun to look at the behavioral impact of polymorphisms, natural variations within a gene (SN: 9/12/98, p. 167). In animals, differences within biological-clock genes can profoundly alter when the creatures perform daily activities such as exercise or sleeping.

Emmanuel Mignot of the Stanford University Sleep Disorders Center in Palo Alto, Calif., and his colleagues looked at a polymorphism in *Clock*, a gene that encodes a protein crucial to the mammalian biological clock (SN: 7/11/98, p. 24). The researchers hypothesized that differences in the gene's DNA sequence might alter the timing of a person's clock, predisposing them to morning or evening alertness.

They asked 410 people to fill out a questionnaire designed to evaluate timing preferences for sleep and other activities. They also classified each person by whether, at a particular point in the gene's overall sequence, his or her two copies of *Clock* contained the DNA subunit cytosine or thymine.

A statistical analysis indicated that people with two thymine versions of the *Clock* gene are more morning oriented than those with one or two copies of the cytosine form. The difference wasn't large, however. Asked questions including when they typically wake up or get tired, people with the cytosine form of *Clock* gave answers that, on average, trailed the thymine group by 10 to 44 minutes.

Since the polymorphism studied is not within the protein-encoding part of the gene, Mignot suggests it merely serves as marker for a polymorphism not yet discovered. "The *Clock* gene is huge. There could be something else going on," he says.

Although disappointed that this initial polymorphism doesn't seem to fully explain the large behavioral differences seen in people, Thomas Wehr of the National Institute of Mental Health in Bethesda, Md., notes that scientists have only recently discovered several genes involved in the human biological clock. For future studies that could uncover polymorphisms with much stronger influences on the clock, Wehr and other scientists are now identifying people who are extremely morning- or night-oriented.

Mignot's study "is the first, and it may not be the most dramatic," Wehr says, "but it's a sign of things to come."

—J. Travis