

COURTESY OF MIKE BALL

Michele Nishiguchi, a New Mexico State University biology professor, swims near a giant clam in Australia's Great Barrier Reef.

Squids help light way to knowledge

■ Luminescent bacteria in creature's belly is useful tool for researchers

BY OLIVIER UYTTEBROUCK
Journal Staff Writer

Michele Nishiguchi has spent much of her career studying an odd relative of the cuttlefish that makes light in its belly.

The bobtail squid, which grows no longer than a pinky finger, uses a luminescent bacteria to help it blend in with moonlight.

As such, the little squid has many lessons to teach about microbiology and disease, said Nishiguchi, a New Mexico State University biology professor. "We can learn more about how bacteria infect animal tissues," she said.

Bobtail squid have evolved a symbiotic relationship with a bacteria, *Vibrio fischeri*, that grows inside a specialized organ in the animal's underside. The bacteria causes the squid's "light organ" to glow with an intensity similar to moonlight, making the squid virtually invisible to predators and prey below.

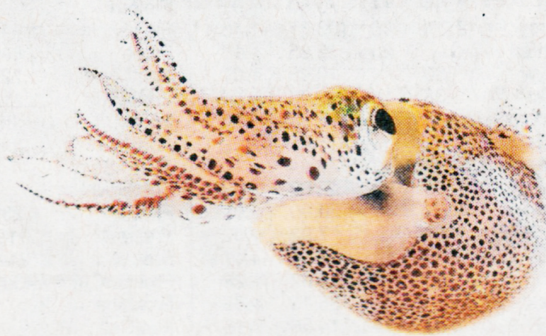


After a night of foraging, the squid expels 95 percent of the bacteria. During the day, while the squid is burrowed into the sea floor, the remaining bacteria multiply and recolonize the light organ.

Vibrio fischeri is harmless to the squid and to humans. But the bacteria is a close cousin to a pathogenic variety, *Vibrio cholerae*, that causes cholera — a potentially deadly illness that sickens up to 5 million people a year.

The cholera bacteria is transmitted by contaminated food and water. It spreads easily when untreated sewage is discharged into drinking water, most often in poor

See **SQUIDS** on **PAGE B6**



COURTESY OF MATTIAS ORMESTAD

A bobtail squid photographed in Hawaii.

Squids an essential part of research

from **PAGE B4**

countries with ineffective sanitation systems.

Of the many varieties of bacteria that live in seawater, only *Vibrio fischeri* has developed the ability to colonize the squid's light organ, which has a structure similar to a human intestine.

"Of all the bacteria in an environment, how do specific ones get into an animal?" Nishiguchi said. The question is important because the human body contains millions of bacteria, both harmful and beneficial, she said.

"In the case of a pathogen, we want to prevent that," she said. "In the case of a beneficial microbe, we want to see how that relationship has evolved over time and how we can promote that."

The bobtail squid gives scientists a safe way to study the mechanisms bacteria use to infect an animal, said Nishiguchi, who collects the animals at sites throughout the world, including Australia, France, Hawaii and the western Pacific, often with the help of students.

In all, 15 students, including eight undergraduates, work in

Nishiguchi's lab in Las Cruces.

"I tell the undergraduates, you don't have to work on squid when you graduate and go to graduate school," she said.

Her experiments, which include altering the bacteria's DNA to change its characteristics, offer students valuable lessons about the realities of laboratory research, she said.

"You learn how to do science," she said. "You learn how to think critically. You learn how to ask logical questions."