

Why Is Seaweed Killing Florida's Coral Reefs?

By Bijal P. Trivedi
for National Geographic Today

August 23, 2001

Scientists returned today from a ten-day underwater mission to find out more about a species of brown seaweed that is suffocating Florida's vibrant coral reefs.

Over the last 15 years, the seaweed, *Dictyota menstrualis*, has grown particularly abundant in the reefs of Florida, the Bahamas, and the Caribbean. In some areas, it covers from 30 to 70 percent of the reefs and seafloor.

"It makes the reef look brown and skuzzy," said Kevin Beach of the University of Tampa in Florida, who led the study.

Growing into a thick, spongy turf that smothers and kills the colorful sponges and corals, *D. menstrualis* transforms the underwater landscape.

Although the seaweed is indigenous to the Florida keys, scientists aren't sure why it became much more abundant in the late 1980s. They are fairly certain, however, that a 1983 blight that wiped out 95 percent of the population of black long-spined sea urchins was a major factor.

The sea urchin, *Diadema antillarum*, is a voracious grazer that scours the reefs and keeps them free of excessive seaweed. The loss of *D. antillarum* from the reef enabled the seaweed to grow unchecked.

"Losing the urchins from the reef is like removing sheep from a pasture. The *Dictyota* just grows and grows," says Steven Miller, the director of Aquarius, the underwater laboratory in the Florida Keys National Marine Sanctuary, where Beach and his colleagues were based during their recent mission.

Underwater Lab

D. menstrualis not only smothers the reefs but also produces noxious chemicals that deter fish from grazing on the seaweed. "I have actually watched fish eat *Dictyota* and then spit it out," said Miller.

But Beach suspects the problem is caused by more than just the lack of grazing urchins. He thinks the reefs are being polluted with nutrients from nearby resorts and housing developments, which are overstimulating the plant growth.

"In a pristine reef you are not supposed to see much seaweed," said Beach. "Seaweed needs a lot of fertilizer, and normally reefs don't have a lot of nutrients."

To test his theory, Beach and three other scientists went to the Aquarius laboratory, which is 60 feet (18 meters) underwater and 3.5 miles (5.5 kilometers) from the shore.

For ten days the scientists lived at Aquarius while conducting their experiments. Because the lab is underwater, scientists can spend eight to ten hours a day working at depths of 60 to 120 feet (18 to 36 meters). If the scientists dove to these depths from a surface vessel, they would be limited to 30 minutes of diving a day because of the risks of becoming ill from decompression, which can be lethal.

Study of Nutrient Levels

Beach's goal was to determine what factors—such as sunlight and nutrients—affect the growth of *D. menstrualis*. His colleague Linda Walters of the University of Central Florida in Orlando focused on how the plant can propagate so rapidly.

Beach installed a number of nutrient dispensers near a patch of the seaweed and measured the rate of

photosynthesis that occurred over ten days. He will analyze the data to find out whether there was a sudden growth spurt that correlated with the higher nutrient levels.

Walters studied how the plant replicates by fragmentation. When fragments of *D. menstrualis* break off from the main plant, they can put out roots within hours of landing on sponges, corals, and sand, Walter explained.

"Dictyota is very fragile and breaks easily," she said. "The more fragments are dispersed, the faster *Dictyota* replicates."

While Beach and Walters study *D. menstrualis*, other scientists are trying to aid recovery of the corals by restocking the reefs with sea urchins. If Beach finds, however, that high nutrient levels are responsible for the overgrowth of the seaweed, broader measures may be needed to save the coral reefs, such as revising Florida's water-quality standards.

A story describing attempts to restore the reefs by replenishing the sea urchin population was reported on National Geographic Today, shown only on the National Geographic Channel, at 7 p.m. ET/PT in the United States.