Changing sexes on the sea floor

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This is a photograph of the female C. echinata coral, expelling its eggs into the water around it. Credit: AFTAU

Trees do it. Bees do it. Even environmentally stressed fish do it. But Prof. Yossi Loya from Tel Aviv University's Department of Zoology is the first in the world to discover that Japanese sea corals engage in "sex switching" too.

His research may provide the key to the survival of fragile sea corals ? essential to all life in the ocean ? currently threatened by global warming.

In times of stress like extreme hot spells, the female mushroom coral (known as a fungiid coral) switches its sex so that most of the population becomes male. The advantage of doing so, says the world-renowned coral reef researcher, is that male corals can more readily cope with stress when resources are limited. Apparently, when times get tough, nature sends in the boys.

"We believe, as with orchids and some trees, sex change in corals increases their overall fitness, reinforcing the important role of reproductive plasticity in determining their evolutionary success," says Prof. Loya, whose findings recently appeared in the *Proceedings of the Royal Society B*.

The Will to Fight and Survive

"One of the evolutionary strategies that some corals use to survive seems to be their ability to change from female to male," says Prof. Loya. "As males, they can pass through the bad years, then, when circumstances become more favorable, change back to overt females. Being a female takes more energy. And having the ability to change gender periodically enables a species to maximize its reproductive effort."

Corals, though a part of the animal kingdom, can act like plants. Both are sedentary life forms, unable to move when times get tough.

In stressful environmental conditions, male corals can "ride out the storm," so to speak, says Prof. Loya. "Males are less expensive -- in the evolutionary sense -- to maintain. They are cheaper in terms of their gonads and the energy needed to maintain their bodies," he adds.

He also notes that this theory probably doesn't apply to humans, even those who have opted for a sex change.

While admired for their beauty by divers, coral reefs provide an essential habitat for thousands of species of underwater creatures. Without the reefs, much of the underwater wildlife in reef habitats would perish. And for millions of people in the tropical regions, coral reef sea life is a major source of daily protein.

Keeping the Food Chain and Natural Wonders Alive

Coral reef destruction, however, is expected to continue as an effect of global warming. About one-quarter of coral reefs around the world have already been lost. Prof. Loya's finding may give new insight to scientists into developing coral breeding strategies for the time when the massive climate changes predicted by scientists set in.

"This knowledge can help coral breeders. Fungiid corals are a hardy coral variety which can be grown in captivity. Once you know its mode of reproduction, we can grow hundreds of thousands of them," says Prof. Loya, currently involved in coral rehabilitation projects in the Red Sea.

Prof. Yossi Loya has been studying coral reefs for over 35 years. He has also won the prestigious Darwin Medal, awarded once every four years by the International Society for Coral Reefs, for a life-time contribution to the study of coral reefs.

Source: American Friends of Tel Aviv University