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Photo by: Prof. Amatzia Genin, The Hebrew University

Eilat corals uniquely resistant to bleaching deterioration

By SHARON UDASIN
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Researchers find that "warm-water barrier" in the southern Red Sea allows only heat-tolerant genotypes of corals to enter from the Gulf of Aden.

The vibrantly colored coral reefs of the northern Red Sea are unlikely to fall victim to the deteriorative process called coral bleaching that plagues so many other reefs around the globe, Israeli researchers have found.

Despite the fact that the Gulf of Eilat/Aqaba marine ecosystem is experiencing the rise in water temperature that causes so many reefs to fall prey to bleaching, the area contains a unique quality that prevents the deterioration from occurring, according to a team of researchers from the Hebrew University and Bar-Ilan University. The researchers published their findings in the journal *Global Change Biology* on Monday, in an article called "A Coral Reef Refuge in the Red Sea."

Coral bleaching typically occurs when seawater temperatures exceed the local summer maximum by 1 to 1.5 degrees Celsius, the researchers explain. At such temperatures, the coral's symbiotic algae are lost, which leads to the coral's bleaching and consequential death.

Water temperatures in the Gulf of Eilat/Aqaba are also rising, but the researchers have found that a "warm-water barrier" exists in the southern Red Sea, which allows only heat-tolerant genotypes of corals to enter the Red Sea from the Gulf of Aden. This process occurred following the disappearance of corals from the Red Sea during the last glacial period, approximately 15,000 years ago, the researchers explained. Scientists therefore predict that no bleaching will occur in the area for the next century, making the region a unique refuge for coral reefs.

"This is the only one that I think exists on Earth," Prof. Amatzia Genin, one of the researchers, of the Alexander Silberman Institute of Life Sciences at the Hebrew University, told *The Jerusalem Post* on Sunday. "I am unaware of any similar place on earth where a refuge like this can be found."

Working with Genin on the research, which was conducted at the Interuniversity Institute for Marine Sciences in Eilat, were Dr. Hezi Gildor of the Hebrew University's Fredy & Nadine Herrmann Institute of Earth Sciences and Dr. Maoz Fine of Bar-Ilan University's Mina and Everard Goodman Faculty of Life Sciences.

One reason that the Red Sea is so "special" is because it crosses multiple latitudes, Genin explained.

"It starts at low latitude where it's tropics and warm and goes all the way to Eilat where it's the subtropics," he said "It's much colder, especially in the winter."

Today, the water depth at Bab el Mandeb – the entrance of the Gulf of Aden to the Red Sea, adjacent to Eritrea – is only 137 meters, in comparison to the middle of the Red Sea, which stood at 2.5 kilometers, Genin said. While 137 meters already constitutes a shallow water depth, during the Glacial period this area featured a depth of only about 10 meters, he explained.

"Given the very shallow and narrow entrance, there is not enough room for much water to enter the Red Sea," he said.

However, about a half a centimeter of water evaporates from the Red Sea every day into the atmosphere, and the Glacial period featured waters of very high salinity due to the extremely narrow and shallow pathway through which the sea could receive water, according to Genin.

"That caused a total disappearance of all coral reefs, fish," he said, noting that everything disappeared aside from primitive organisms that thrive in high salinity levels.

This situation necessitated a "restart," and only 8,000 years ago did the air temperature return to warm enough levels for corals to thrive. But at that point, every coral that entered the Red Sea had to go through Bal el Mandeb, meaning it needed to be able to endure very warm temperatures, Genin explained.

"Only corals with genotypes that provide them with adaption to high temperature could enter the Red Sea," he said. "Eventually they made it all the way to Eilat."

These corals can tolerate temperatures of up to about 32 degrees Celsius as that is the temperature near Bal el Mandeb, Genin continued. Because the Eilat/Aqaba Gulf has currently only reached about 27 degrees Celsius, they have at least another 100 years in the area to thrive – giving scientists an added chunk of time to develop technologies capable of extending their viability further, he added.



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