

Off Miami, scientists put corals to a heat-stress test. It's survival of the fittest

August 7 2023, by Nicolás Rivero, Alex Harris, Miami Herald



Credit: Pixabay/CC0 Public Domain

With a gentle pat, Wajahat Shera cemented a four-inch staghorn coral

fragment onto a patch of seafloor two miles east of Key Biscayne—one of many planted Friday as part of an unusual undersea experiment being run by University of Miami scientists.

These corals, previously collected from a range of reefs off South Florida, are being put to a critical heat-stress test. Some likely won't survive the high ocean temperatures off the state that threaten to devastate much of the natural reef tract. But if some do—and that's the hope—it could help identify [coral](#) types more likely to endure future climate change.

Putting corals in harms way is the opposite of what scientists, agencies and volunteer divers have been doing for the last month. They've been evacuating thousands of growing coral fragments from offshore nurseries where the scientists had planted them months or even years before. They've been placed them in onshore tanks, building a sort of Noah's Ark for [coral species](#) to preserve their [genetic diversity](#) in case heat-caused mass bleaching events wipe out entire reefs in Miami-Dade County as they have already in the Keys.

But on Friday, UM scientists—with help from volunteers like Shera—planted some 75 coral fragments on Paradise Reef off of Key Biscayne. The fragments come from more than 20 reefs ranging from Key Largo up to Broward County and could have genetic differences that might make them more heat tolerant. If some strains survive the warm waters that have already turned many corals on Paradise Reef white, they might one day help repopulate other reefs decimated by high temperatures.

The white corals are suffering from a reaction called bleaching, in which stressed-out corals spit out the algae that live in their tissues and provide them important nutrients. Corals can typically recover from short bleaching events but prolonged ones can kill them—and this summer's

record heat wave has many scientists worried about massive losses.

"It has heavily impacted the Florida Keys, bringing many coral scientists to tears because we really have never seen anything like this," said Dalton Hesley, a senior research associate at UM's Rosenstiel School of Marine, Atmospheric, and Earth Science (RSMAS) who manages the school's Rescue a Reef program.

A day of underwater coral gardening

Hesley and a team of five research assistants enlisted half a dozen volunteers, including Shera, to help with the planting.

The 30-foot dive in calm waters was relatively tame for Shera, 41, a certified rescue diver who—for fun—has dived in chum-filled waters alongside lemon sharks, tiger sharks and bull sharks. But this day of coral gardening was unlike any other experience he's had underwater.

"It's very different from any other dive I've done," said Shera, a health care administrator who took up diving as a hobby four years ago.

"You're not just diving for yourself, looking around at all the pretty fish. You're more focused on doing your work without hurting the corals."

The scientists and volunteers started their day at a coral nursery just next to Paradise Reef. There, buoys suspend long ropes tethered to the sea floor. Attached to the ropes are a series of horizontal bars, and hanging from each bar, like Christmas ornaments, are small coral fragments just a few inches long.

The fragments grow quickly in these structures, which the scientists call "coral trees." Different sections of each tree correspond to different coral populations taken from reefs across South Florida. On their first dive of the day, the group used small pliers to clip fragments of coral

from different tree sections and place them into mesh bags.

As pairs of volunteers swam from tree to tree, pruning their corals like an underwater topiary, researchers armed with underwater clipboards kept track of which corals went into which bags.

Back on the surface, the volunteers used a special underwater cement to stick fragments from each coral population onto carefully labeled concrete discs. Then the team dove into the water once more to plant the discs, and a few loose fragments, onto open spaces in Paradise Reef.

Researchers picked the spots where corals would go, brushed them clear of algae and debris, and then used piping bags, like the kind a baker might use to pipe frosting onto a cake, to place small dollops of cement onto the seafloor. The volunteers, swimming alongside parrotfish, butterfly fish, yellowtail snapper and at least one nurse shark, nestled their corals onto the cement globs.

As Shera worked school of grunt drifting nearby eyed his work impassively. But a University of Miami research scientist accompanying Shera on the dive flashed an underwater OK signal to indicate a job well done.

As the volunteers returned to the surface, the newly planted coral fragments awaited their fate. On the day of the dive, the water temperature hovered around the mid-80s, which is safe for corals. But Hesley noted there is a "non-zero" chance that temperatures could pick up this summer and wipe out South Florida's reefs.

"We are not out of the woods yet," Hesley said. "August is a very warm month for our oceans and coral reefs, so that is making this time point very critical for us to do everything we can while we can."

Thousands of coral fragments rescued

The decision to outplant new, hopefully more heat-resistant corals was paired with a rush to rescue thousands of coral fragments that might not prove as resilient.

On Tuesday, it was all hands on deck at UM's hatcheries lab. Professors, graduate students and volunteers gathered to retrieve staghorn coral fragments from the university's nursery offshore of Key Biscayne.

The brown, branching corals were in good shape. And after a quick dunk in a cleansing iodine bath, scientists strung them up on PVC pipes in a large saltwater tank on land. Here, the corals will hopefully be safe for a few months, when the water cools down enough to replant them.

"Hopefully we did all of this for nothing," said Diego Lirman, the RSMAS associate professor who created the Rescue a Reef program. "They'll be safe here."

This week, the team brought more than 2,000 coral fragments ashore, which still leaves more than 75% of the nursery's branching corals (staghorns and elkhorns) out at sea.

Beyond simply protecting some genetic stock in case bleaching tragedy strikes, the research team was also racing a different deadline, this one set by nature. Thursday began a short window in which these two important species of coral could reproduce, a once or twice-a-year activity.

With all the heat stress and bleaching, some researchers worried that this year's spawning event could be disrupted or ruined altogether.

On Wednesday and Thursday night, the rescued corals spawned in their

tanks, UM researchers reported. But they weren't able to verify whether the corals that are still in the ocean spawned Thursday night.

Even if the elkhorns and staghorns did manage to spawn, shooting billions of baby corals out into the nearby [reef](#), it's unclear whether the same conditions that threaten the parents might also harm the infants.

"It's not a great time to be a baby coral if they do spawn," said Ian Enochs, lead of the coral program at the Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami.

2023 Miami Herald.

Distributed by Tribune Content Agency, LLC.

Citation: Off Miami, scientists put corals to a heat-stress test. It's survival of the fittest (2023, August 7) retrieved 3 May 2024 from <https://phys.org/news/2023-08-miami-scientists-corals-heat-stress-survival.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.