

CLIMATE SOLUTIONS

Why some corals are better off dead

As scientists rush to save ailing corals elsewhere, in Venezuela locals are trying to kill off this stinky variety.

Fire coral is engulfed by Unomia stolonifera at Cachicamo Island in Mochima National Park on Nov. 22. (Ana María Arévalo Gosen for The Washington Post)

VALLE SECO, Venezuela — Estrella Villamizar grabbed the soft red and white coral by its stem and hacked it off with a blow of her wooden knife before tossing it in a bucket with other pieces she'd already ripped out of the Caribbean waters lapping against this deserted beach.

On the sea bed, stretching for a distance as far as the eye could see, a blanket of the dark coral swayed in the warm current.

As ocean temperatures reach record highs, scientists elsewhere have been rushing to save reefs, moving coral to land nurseries to preserve it and dreaming up novel ways to cool it off at sea. But here in Venezuela, reefs face a different kind of lethal threat: *Unomia stolonifera*, an invasive coral species that is smothering native varieties.

Hailing from Indonesia, the slimy cauliflower-looking coral has expanded across the shores of four states in Venezuela, covering at least some 1,000 square miles.

“At this point, it is almost certain that it will invade the entirety of the Caribbean,” says Villamizar, a tropical ecology professor at the Central University of Venezuela.



Estrella Villamizar, left, a researcher at the Tropical Zoology Institute of the Central University of Venezuela, and Maria Cristina Goite, a chemist from the Venezuelan Institute of Scientific Research, submerge into Cepe Bay, on Nov. 6. (Ana María Arévalo Gosen for The Washington Post)



Unomia Stolonifera carpets the seabed off the coast of Valle Seco in Aragua, Venezuela. (Video: Camille Rodríguez Montilla)



Villamizar, right, and Goite measure the growth rate of the Unomia stolonifera coral on Nov. 8 in Valle Seco, Choroní, the primary focus of the Unomia stolonifera invasion in Aragua, Venezuela. (Ana María Arévalo Gosen for The Washington Post)

She is part of a team of biologists, chemists, villagers, and entrepreneurs fighting to keep Unomia at bay. It's a battle they're waging with limited tools. Years of economic duress country's research centers. Government budgets to do this kind of work, meanwhile, are nonexistent. So they have come up with out-of-the-box approaches, from creating underwater hacking machines to finding ways to turn the slimy coral into a usable product, making its harvesting a profitable business. If left unchecked, Unomia could decimate local reefs and the animals and plants that depend on it.

Already, it's devastating local villages. Fishers report that last year was one of their worst. Israel Sosa, a longtime fisherman in these waters, says his haul has dropped from about 33,000 pounds of Albacore fish in a 48-hour shift just a few years ago to closer to 220 pounds.

“If it kills the native coral, it would completely end the coast's life,” says 55-year-old César Jove, who spends his afternoons cleaning the beach for tourists about 310 miles away, where Unomia made its first appearance more than a decade ago.



Fishermen work on Nov. 10 at the Guayamure fishing point, which is a 15-minute boat ride from Puerto Colombia. The livelihoods of these fishermen and their families are tied to fishing, which has seen a noticeable decline in the past year. (Ana María Arévalo Gosen for The Washington Post)

Ground zero

Marine biologist Juan Pedro Ruiz-Allais was the first to spot Unomia in 2007 inside Mochima National Park in northeastern Venezuela, where he spent most of his childhood. As soon as he spotted the tentacle-looking stems, he realized it was not a native species.

According to local fishermen, an aquarist allegedly introduced the coral to the area, hoping to harvest it and sell it as fish tank decoration. In its native Indonesia, Unomia has natural predators such as sea slugs that keep it in check. But without a natural predator outside of the Indo-Pacific, it's spiraled out of control in Venezuela, Ruiz-Allais said.

Surveys he conducted along with other researchers showed Unomia taking over other species of coral and seagrass beds that serve as food sources and nurseries for fish and other animals. Some of these areas were already battered by overfishing and pollution. Ruiz-Allais also found the invasive coral has proved to be more resilient than its native counterparts, thriving in a much broader range of temperatures and light.

The researcher said he alerted the government of the invasive species years ago but didn't get a response.

The Ministry of Ecosocialism did not respond to a request for comment. Several people familiar with the matter said the government has barred researchers who depend on it for funding from talking about Unomia.



Mariano Oñoro, a coordinator with the Unomia Project, teaches students at the Don Bosco school in Barcelona about the danger and risk of the invasive coral on Nov. 21. (Ana María Arévalo Gosen for The Washington Post)



Fishermen pull in nets off the coast of Choroní, Venezuela, where the invasive Unomia coral has disrupted local fishing. (Video: Camille Rodríguez Montilla)



Fragments of the Unomia coral were detached after being targeted with an ultrasound gun created by García. Another machine then sucks up the coral. (Ana María Arévalo Gosen for The Washington Post)

García, who owns a vessel rebuilding company, Grenyachts, also had the funds to do it, overcoming another major obstacle in fighting Unomia. So far, he has spent almost \$1 million out of pocket, which he expects to make back by renting out the machinery to international organizations and governments that may want to remove Unomia in the future. That includes Venezuelan officials, who already granted him permission to carry out some of his research.

With his current setup, he can clean one square meter, or around 10 square feet, of Unomia-covered native coral in one minute, compared to the hour or more it would take a professional diver to do it.

“This is a fight for decades, generations,” he said.



Biologist Jesús Subero dives near a seabed teeming with Unomia in Mochima National Park, a hotspot for this coral invasion, in November. (Ana María Arévalo Gosen for The Washington Post)

An invasive business

Meanwhile, Project Coralien, a group of marine biologists and chemists that has received some government funding to research Unomia, is looking at another way of overcoming the lack of funds. The group is trying to find a commercial use for the coral, so harvesting it becomes a business.

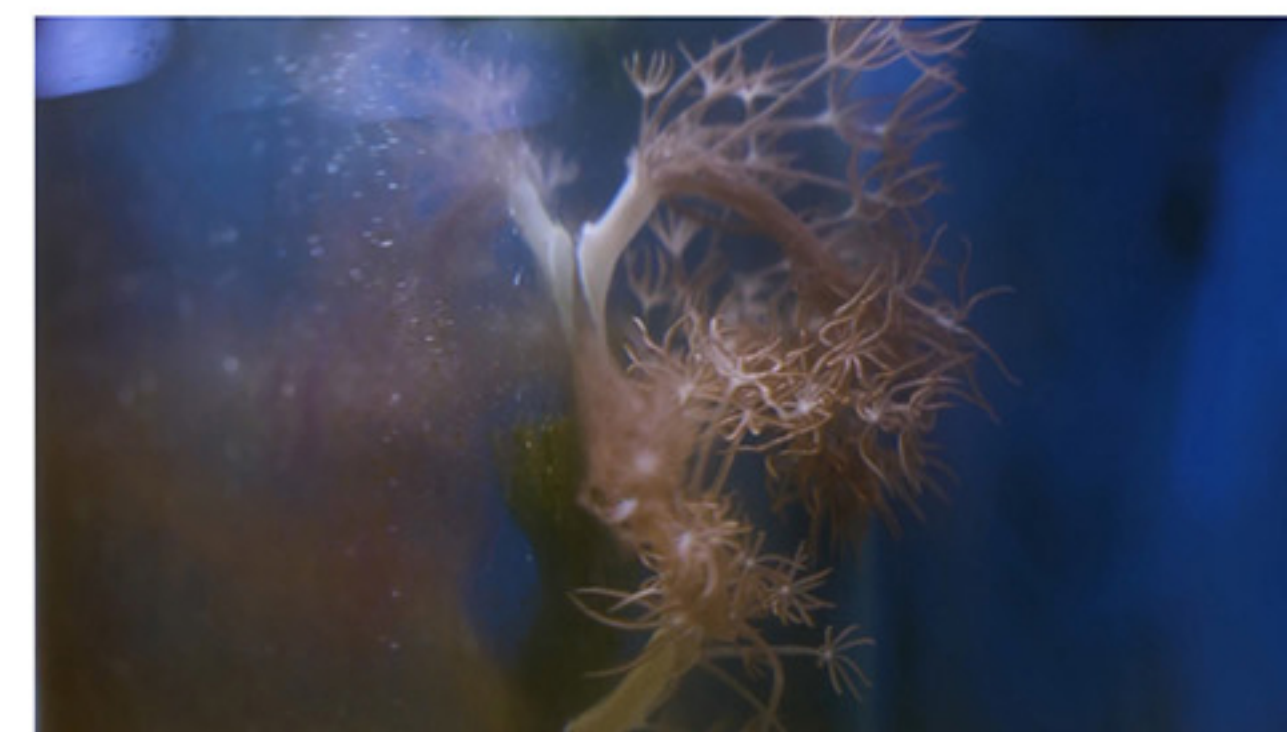
One idea is to make it into a waterproofing material or a fluorescent material similar to rhodamine, a dye used in biotechnology. So far, these ideas seem promising, but to test them out, the team needs a molecular magnetic resonance imaging machine to separate Unomia's chemical compounds and determine their specific uses.

Rubén Machado, who heads the atomic energy department at the Venezuelan Institute for Scientific Research, remembers a time when the country had seven such machines. Now they have none. Once the government defunded research institutions, the equipment was not maintained and became obsolete. Looters vandalized and damaged one of the machines.

Replacing the equipment is expensive — and complicated. Foreign companies are subject to sanctions when doing business in Venezuela, so its makers are reluctant to sell it to the researchers. Álvaro Álvarez, Project Coralien's chief chemist, wrote a letter to the United Nations authorities who oversee sanctions, asking for an exception. So far, he has received no answer.

Machado says his group will keep trying because he believes making Unomia profitable is the only way to eradicate it.

“The possibility is there,” he said. “But we need to be able to prove it.”



Project Coralien studies Unomia stolonifera in their lab to research commercial uses for the invasive coral. (Video: Camille Rodríguez Montilla)

This story was produced in partnership with the Pulitzer Center.