# Sea urchin repopulation project promotes symbiotic relationship with reefs [1]

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At the Ceiba nursery, the urchins are fed and cared for until they are ready for release to the reefs (David Villafañe Ramos).

## The survival of the species is crucial for the protection of these coastal barriers, as they feed on algae that affect corals.

**Ceiba - A project that began nine years ago, with the intention of contributing to the repopulation of sea urchins in the waters near Puerto Rico, has managed to release some 5,500 individuals of this species of echinoderm into the ocean**, a figure that should multiply in the coming years, thanks to the establishment of a second nursery located in this municipality, which will support the management that the **Center for Research and Restoration of Marine Organisms** (Cirom) in **La Parguera**, in **Lajas**, has already been carrying out.

The effort led by **Cirom** -one of the projects under the umbrella of the Institute for **Socio-Ecological Research (ISER) Caribbean**- **is of unique importance, since the so-called black urchin (also known as diadema urchin) has not only suffered from multiple mass mortality events in the past four decades, but the animal plays a key role in the protection of coral reef systems**. The reefs, in turn, are a crucial natural barrier for the defense of the archipelago's coastal ecosystems, increasingly threatened by phenomena such as erosion and migration inland from the coastline.

"Now, we are producing thousands of urchins every year and the results are very good. **When we transfer them to the reefs, (the urchins) diadema eat the algae in one month. Already in two**

**months, they can reduce the algae cover by 60%, especially the encrusting algae**, which is a danger and can grow on top of the corals and kill them," explained oceanographic biologist **Stacey Williams**, who has studied reef systems in 15 Caribbean countries and directs Cirom's urchin "farming" project.

In the nursery located at the former Roosevelt Roads base, which El Nuevo Día recently visited, there are over a dozen tanks filled with seawater, where Cirom's team feeds and cares for the urchin specimens until they are ready for release to the reefs. **In addition to the diadema, the facility also breeds individual white urchins, which also serve the function of protecting corals from algae**.

"They live in different habitats. The diadema, likes deeper reefs, and the 'tripneustes' (white urchin) lives in flatter waters. They eat different algae. They have different niches," explained Williams, who completed his doctoral dissertation in the **Department of Marine Sciences at the University of Puerto Rico (UPR) Mayagüez Campus (RUM)**, with work focused on the slow recovery of the diadema urchin population after a mortality event in the 1980s.

Although since 2014 Cirom has managed the nursery in the La Parguera area, setting up another space in the east has facilitated the logistics of transporting urchins that are "planted" in key points of the reef systems surrounding Puerto Rico. In July, the Ceiba nursery - located next to the Marine Unit of the Department of Natural and Environmental Resources (DNER) Marine Corps - will celebrate one year since its opening.

"One of the places Stacey used to bring urchins was to Palomino Island, which is within the reserve we manage. If something works, I always think about how I can support it to grow, and it was very obvious that having a nursery closer (was convenient). We have Arrecifes de la Cordillera, which are all the keys, it is a very wide chain of reefs (east of Puerto Rico). We have the reefs of the Ceiba Keys, we have Vieques and Culebra. It was not cost-effective to continue bringing them from La Parguera," said Ricardo Colón, management officer of the Cordillera Reefs Nature Reserve and the agency's liaison with Cirom.

## Breeding potential

For the time being, Cirom does not breed urchins at its Ceiba facility, but traps them in the open ocean and then raises and releases them once they become juvenile adults.

las especies que se crían en Ceiba, y ambos cumplen la función de proteger los corales de las algas.
ma and white urchins are the species bred at Ceiba, and both serve to protect corals from algae (David Villafañe Ra

"We catch the black urchins when they are very small in the open sea. We put traps in places where we know the larvae arrive because of the currents. The larva sticks and becomes a recruit and it is the very small urchin (what is brought to the nursery)," explained Jorge Casillas, project supervisor, while Williams pointed out that, at that stage, the urchin is barely one millimeter long.

"**Here, they begin to feed and grow. The white urchin, that one in La Parguera already has the padrotes, they do some procedures to connect the gametes and reproduce the larvae and continue through all the stages. The white urchins that you see here were reproduced in La Parguera**", Casillas added, pointing out that, in the future, they hope to have a reproduction laboratory in Ceiba.

**Ideally, individuals are ready for release at four to five months, but typically it is a process that takes about a year.**

Eventually, Williams said, they also aspire to breed the stone urchin. "They're smaller than the diadema, but they eat algae like the diadema. We're going to have three species of urchins," he noted.

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**Ideally, the population density of diadema urchins should fluctuate between two and five individuals per square meter of reef, but, of the areas that have been sampled, only in Tamarindo beach, in Culebra, that parameter is reached, Colón said.**

"The standard is for us to be well below," he acknowledged. "I think a project like this has to be running indefinitely until we see a dramatic change in the ecosystem."

Funding for the nurseries depends largely on federal grants accessed through competitive processes (David Villafañe Ramos).

In addition to the DNER, the ISER Caribe and Cirom projects are supported by the National Oceanic and Atmospheric Administration (NOAA) and the federal Fish and Wildlife Service. Funding, however, is largely dependent on federal grants accessed through competitive processes, making it difficult to secure recurring cash flow.

"What we have seen during this administration at the federal level is that there has been an increase in access to funding for environmental and conservation and environmental protection initiatives, including living organisms. Our work team has been in charge of seeking these proposals and increasing access for us to give these tools to non-governmental entities that help us expand these types of projects," said DNER Secretary **Anaís Rodríguez Vega**.

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