

Unusual coral nursery

Researchers at the Wilhelmshaven site of the Institute for Chemistry and Biology of the Marine Environment (ICBM) have become the first scientists in Germany to succeed in sexually breeding stony corals in the laboratory. Their work in photos

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1 Coral reefs are among the most diverse ecosystems on the planet. But these complex organisms are threatened by anthropogenic climate change and pollution. The hope is that new methods for breeding stony corals can help to reforest damaged reefs.

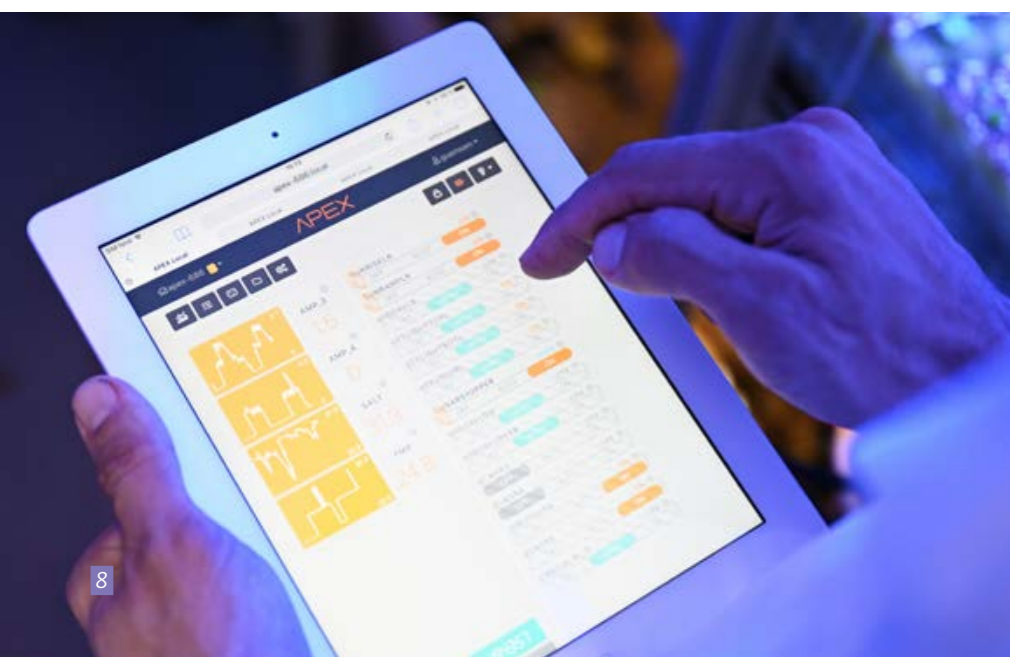
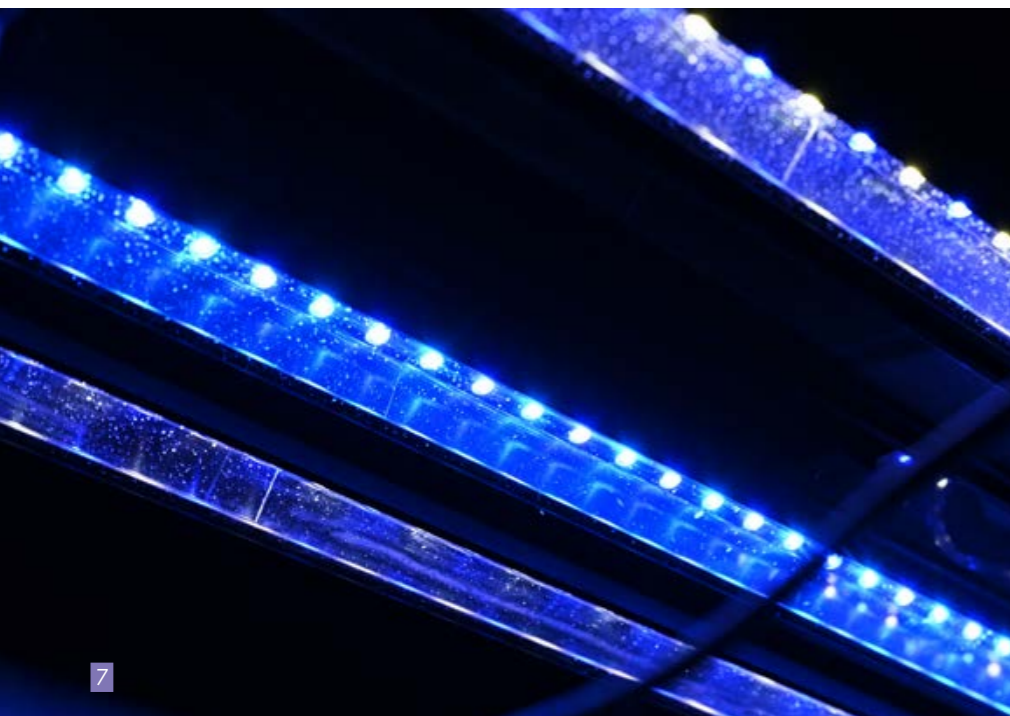
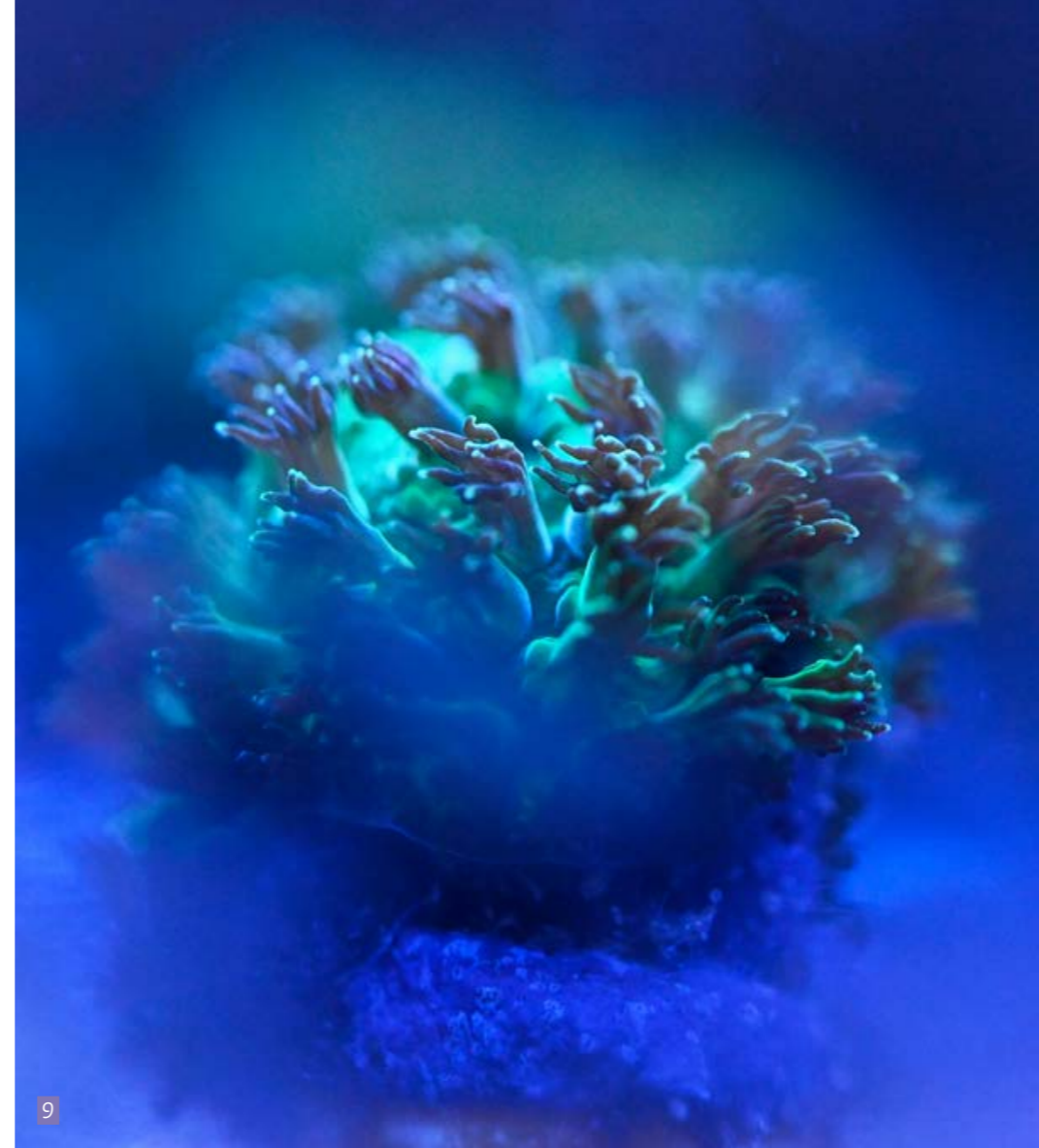
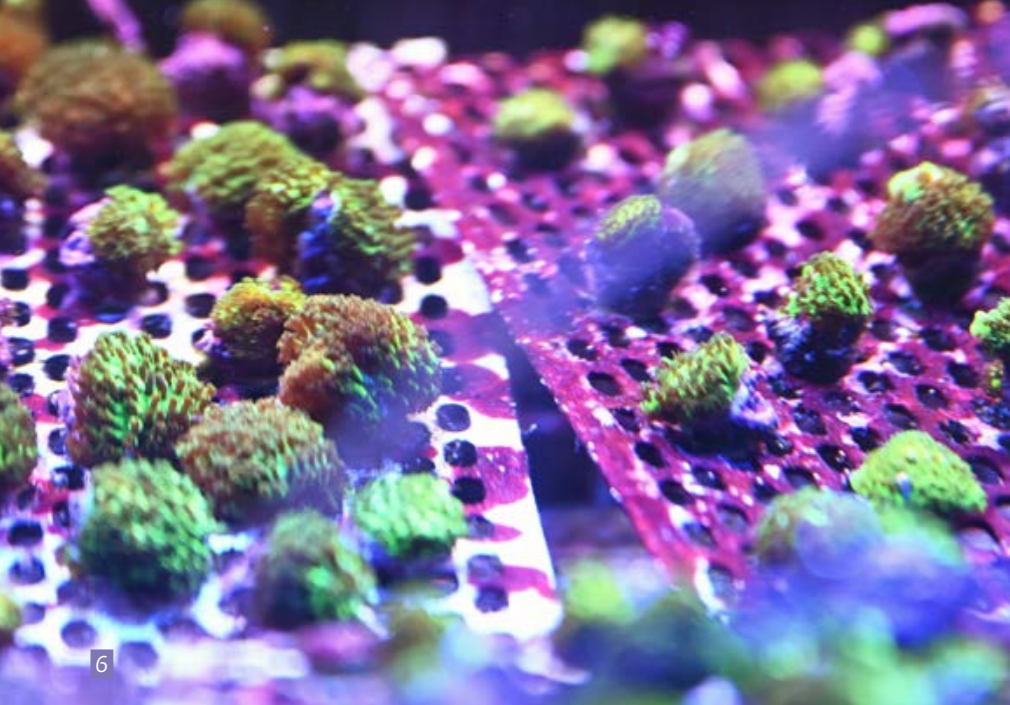
2 Stony corals are colonies of many tiny individual animals, known as polyps, living in a calcium carbonate (limestone) skeleton which forms the backbone of millenia-old reef structures. Currently, the standard method for inducing reproduction in corals in aquariums is fragmentation, an asexual reproduction method in which corals are broken into smaller pieces. The resulting coral fragments grow rapidly but are genetically identical to their parent coral and therefore equally vulnerable to environmental changes such as rising water temperatures.

3 Dr. Samuel Nietzer and his team work in a small, ordinary-looking container. It was here that they managed to induce sexual reproduction in the corals and thus produce genetically diverse and potentially more robust offspring.

4 Acropora corals, a genus of stony corals, spawn just once a year. In this mass event thousands of these individuals release their egg cells and sperm into the water simultaneously – but only under very specific conditions. For the corals to spawn, environmental conditions such as day length, the lunar cycle and the temperature of the water have to be exactly right. The challenge for the researchers was to simulate these natural conditions in the lab.

5 Success came only after a long period of hard work: at precisely the expected time – approximately one week after full moon in December 2020 – the big moment finally arrived and the corals released their eggs and sperm into the water simultaneously. The researchers collected the gametes on the surface of the water and combined the eggs and sperm from different coral colonies in order to ensure the greatest possible genetic diversity in the offspring.





6 "We achieved a fertilization rate of almost 100 percent and were able to settle about 50,000 larvae in a few days," Nietzer explained. He reports that several thousand young corals survived the first months.

7/8 Facilitating the mass spawning event in the lab is a major technological undertaking. Using specially developed technology, the researchers are able to accurately simulate the environmental conditions of the Pacific Ocean where their mother corals originate from. The team controls the chemical composition of the sea water and simulates lunar cycles, water temperature, lighting levels and day length. Inside the little container on the ICBM site it already gets dark at midday: this is the time when the stony corals sleep.

9 By now the largest of the surviving offspring are already several centimetres long. By studying the new larvae and young corals, the researchers hope to pinpoint the factors that induce coral settlement and promote a fast growth.

10 To ensure that the corals continue to grow well, Nietzer checks the health of the animals as well as the water quality daily. Key factor is the composition of the nutrients like phosphate and nitrate, as well as the carbonate and calcium content.

