



### Where I work Kate Quigley

**E**very October or November, over a few specific nights, corals in the Great Barrier Reef release many millions of eggs and sperm into the waters off Queensland, Australia, during a mass spawning event. My research brings this action indoors to Australia's national sea simulator. In this photo, taken in November 2019, I am eagerly peering into the tank because the big dance is about to happen. We use red light to watch the spawning, because it doesn't disturb the coral.

I'm part of a multi-institute collaboration called the Reef Restoration and Adaptation Program. I study selective breeding of corals for heat tolerance in the face of climate change.

In the far north of the Great Barrier Reef (GBR), where the water is hottest, we find superstar corals that survive the high temperatures. These corals breed naturally with ones from farther south during spawning, but that is not happening fast enough to keep pace with rising temperatures. Through selective breeding, we can introduce heat tolerance into

populations that don't have it – such as those in this tank, collected from the Keppel Islands in the southern GBR.

The GBR is the size of Italy. Can we scale up the seeding process by selectively breeding in land-based nurseries, before transferring baby heat-tolerant corals to the reef? Or is it better for tanker ships to put coral reproductive cells directly onto reefs?

Corals have a rich diversity of symbionts – single-celled algae – living inside them. Breeding the host coral for good heat tolerance can get us about a 10-fold increase in survival when temperatures rise. But if we combine that with heat-tolerant symbionts, we get a 26-fold increase.

Selective breeding can buy us time to get the reef's problem under control, but it is no silver bullet. Heat tolerance from natural genetic variation will run out if the temperature continues to spiral upward.

**Kate Quigley** is a research scientist at the Australian Institute of Marine Science outside Townsville, Queensland. **Interview by James Mitchell Crow.**

Photographed by  
Jürgen Freund.