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Coral spawning muted in Republic after 2024 mass bleaching event

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Singapore's coral reefs had a muted reproductive season in 2025, not because of any oil spill that occurred in the last year, but most likely because of mass coral bleaching in 2024, one of the hottest years on record.

Coral spawning was observed in April at Pulau Satumu – where Raffles Lighthouse is located – but the National Parks Board (NParks) and scientists from the National University of Singapore (NUS) said it was more muted than in previous years.

Mass spawning events occur once a year, a spectacular underwater show in which the coral reefs appear to "snow", as they release bundles of coral eggs and sperm. The phenomenon usually happens a few nights after the full moon following the spring equinox.

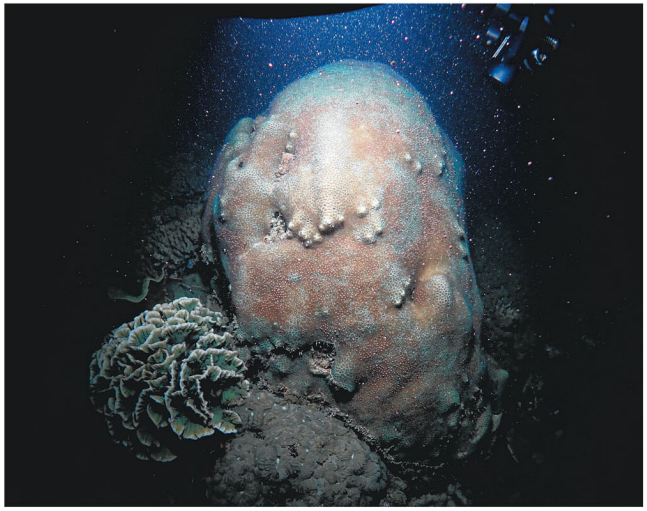
The eggs and sperm then join to form larvae, which are carried by the water until some find a hard surface on which to latch on and grow.

The 2025 spawning event occurred between April 15 and 19. Corals that had recovered from the bleaching in 2024 may not have had enough energy to reproduce this time, said NParks and NUS in a joint response to The Straits Times.

NParks conducts annual coral spawning surveys, along with researchers from NUS' Tropical Marine Science Institute (TMSI) and St John's Island National Marine Laboratory.

While scientists are still analysing how much more subdued this reproductive event is compared with previous years, the scale of the event was similar to the spawning in 2017, which occurred months after the 2016 mass bleaching event.

NParks and NUS said it was unlikely that a series of oil spills and leaks since June 2024 had contributed to the reduced spawning. None of the spills reached Pulau Satumu, which has one of the highest coral cover in all of Singapore's reefs, said local marine biologists.



Coral spawning in April off Pulau Satumu. Mass spawning events occur once a year, a spectacular underwater show in which the coral reefs appear to "snow", as they release bundles of coral eggs and sperm. PHOTO: JEROME YONG

More frequent coral bleaching is a symptom of climate change leading to warming oceans. Higher sea temperatures stress coral reefs, forcing them to expel the algae that give them their vibrant colours. This causes corals to turn a ghostly white.

Past mass bleaching events, including in 2024 and 2016, have also coincided with the El Nino climate phenomenon, which causes sea surface temperatures to rise and elevate global temperatures.

From January 2023 to March 2025, bleaching-level heat stress impacted 84 per cent of the world's reefs, said the International Coral Reef Initiative in April, adding that this global event has been the most intense on record.

This was the fourth global bleaching event, with previous ones occurring in 1998, 2010 and 2016. In those years, the Republic's reefs were also affected.

Singapore's corals, which were gripped by a mass bleaching event between May and October 2024, have mostly recovered, with an estimated 5 per cent of corals left dead after the incident, ST reported in April.

The extent of bleaching and mortalities are observed through reef surveys by scientists, commonly done in the Southern Islands. The peak of this bleaching event was in July 2024, with about 44 per cent of coral colonies surveyed reported to have been bleached.

By December 2024, the level of bleaching in Singapore's waters had dropped to 10 per cent to 15 per cent, said Dr Karenne Tun, group director of NParks' National Biodiversity Centre.

One group of corals that had recovered from bleaching in 2024 but still had subdued spawning was the *Platygyra*, a genus of stony corals such as brain corals.

"This (group) has shown consistent and robust spawning in previous years with no thermal stress events, but only a handful of individuals was observed to spawn in 2025 over the four nights," said Dr Tun.

Most of Singapore's remaining intact coral reefs are found in the Southern Islands, which include Pulau Satumu. Reefs act as an underwater rainforest, sustaining life for fishes, sea sponges, rare seahorses, and other marine life.

NUS TMSI research fellow Lionel Ng noted that muted spawning after mass bleaching events could become an "increasingly frequent reality with climate change".

"This poses challenges to how reefs may be replenished with new genetic material and continue to provide key ecological functions," added Dr Ng.

Subdued spawning will have implications for habitat restoration efforts because it reduces the chances of successful fertilisation and establishment of new coral colonies. Marine biologists will have to devise new strategies and continue to innovate to ensure the survival of this marine habitat, he noted.

It may be worth assessing if other marine life dwelling at the bottom of the sea can also be tapped to help with the rehabilitation of degraded reefs, added Dr Ng.

Not all is lost, however.

History has shown that spawning can improve a few years after a mass bleaching event. Dr Tun noted that while spawning was muted in 2017, it improved significantly in 2018 and 2019.

"Thus, we are hopeful that the corals will recover to full fecundity within the next two years if our reefs are not subjected to any further thermal or other stressors," she added.

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