

Kelp Pathogen Has Spread Across the Southern Ocean

Scientists suspect the gall-forming protist *Maullinia* hitches a ride on kelp rafts to reach new host populations at far-flung sites.



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Across the Southern Hemisphere, patches of seaweed are getting sick. Scientists have found strange yellow growths called galls on kelp in Latin America, southern Africa, and Australasia. The disease is caused by a pathogenic protist that has somehow travelled thousands of miles to infect its hosts.

ABOVE: Diseased-looking kelp potentially infected with *Maullinia*
DAVE CRAW

The parasite in question is called *Maullinia*, and only a handful of studies have investigated it to date. Little is known about exactly how widespread it is or how much it may harm kelp but scientists recently found it in yet another location: New Zealand. Previous studies had detected *Maullinia* in Chile, South Africa's Marion Island, and Australia. Marine biologists lack a full understanding of how kelp is affected by the infections, but some say it's nevertheless cause for concern.

It was while she was working at Australian National University in 2017 that marine biologist Ceridwen Fraser and colleagues reported in the journal *MEPS* that *Maullinia* was present in Australia. "I just thought, now that I've moved to New Zealand two years ago, maybe it's here," she says from her current post as an associate professor at the University of Otago.

In fieldwork that was cut short by the pandemic, Fraser and ecologist Abigail Mabey of the University of Southampton donned wetsuits and clambered around beaches and rocks during low tide at nine sites in New Zealand, eight of which were on the southeast coast of South Island, hunting for specimens of three different kelp species in the genus *Durvillaea*, commonly called southern bull kelp, that had lumpy or spotty tissue suggestive of infection.

After bringing their samples to the lab, they looked for RNA markers that are commonly used to identify strains of *Maullinia* and found two forms. One of these was identical to partial sequences of the pathogen previously obtained in Chile, a species known as *M. braseltonii*. The second sequence was slightly different but the team argues it is likely also *M. braseltonii* as it differed at only five out of 764 nucleotide sites.

Maullinia turned up at three out of the nine locations, and only on South Island, but Fraser notes that the fieldwork being cut short meant that the survey was limited. Fraser, Mabey, and a colleague published their results March 11 in *Marine Biology*.

Globe-trotting parasite

Nonetheless, this is clear evidence that the pathogen is present in New Zealand, meaning it has somehow managed



Abigail Mabey and Ceridwen Fraser
DAVE CRAW

to disperse fully across the Southern Hemisphere. Kelp can form rafts and float for great distances on the ocean surface, which has led Fraser and Mabey to infer that it might, over time, have brought the pathogen with it to new places. A 2010 [study](#) coauthored by Fraser found that several invertebrate species had travelled hundreds of kilometres, from Antarctica to New Zealand, over the course of several weeks via floating kelp.

Fraser and Mabey note that, while some strains of *Maullinia* have turned up in multiple locations, others have not. Those that have dispersed far and wide have been found on various kelp species, specifically, kelp that is buoyant and able to form rafts. In contrast, strains associated only with non-buoyant kelp previously found in Australia have not been detected elsewhere.

Few people have considered the possible dispersal of pathogens via kelp rafts before, says Dan Smale, a community ecologist at the Marine Biological Association in the UK who is co-supervising Mabey's PhD but who was not involved in the New Zealand study.

Claire Gachon, a molecular phycology researcher at the Scottish Association of Marine Science (SAMS), agrees. "I don't say that this is rare in the world or the sea, it's that there is a lack of knowledge," she says. "There is just perhaps a handful of researchers in the world who have been investigating this question."

Consequences of *Maullinia* infection

One of the many mysteries that remain is just how badly, if at all, *Maullinia* may harm the kelp it infects. Research have not yet detected any mass die-offs associated with the parasite but it is possible that the galls formed by *Maullinia* could make kelp more rigid and therefore susceptible to mechanical disturbance by seawater in heavy waves, which could dislodge it from rocks, suggests Pedro Murúa, an aquaculture engineer at the Austral University of Chile. He notes that this hypothesis is yet to be tested.

Kelp is hugely important to marine ecosystems, where it provides a habitat for various commercially important species including lobsters and abalone. And kelp is increasingly farmed as a crop for use in various edible products as well as in toothpastes, shampoos, and pharmaceuticals.

Murúa says that, in Chile, *Durvillaea* kelp is often used as an ingredient in soups or salads, or given to babies when they are teething. Specimens visibly infected by *Maullinia* are generally avoided by kelp harvesters, however, as they prefer a healthy-looking product. “We are leaving in there the susceptible ones, potentially,” suggests Murúa, pointing out that the selective removal of healthy kelp could mean that the seaweed more prone to disease ends up becoming dominant.

A.L. Mabey et al., “Pathogen inferred to have dispersed thousands of kilometres at sea, infecting multiple keystone kelp species,” *Mar Biol*, 168:47, 2021.

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