

ScienceTalk

# Shipping disruptions may fuel spread of harmful alien species

Stefan Huebner  
and Anthony Medrano  
For The Straits Times

An indirect consequence of the disruption to global maritime trade from the coronavirus pandemic is the potential rise of non-indigenous species and their spread. These days, vessels are anchored for unusually long periods.

Idle and waiting, vessels see the emergence of biofouling, resulting in the growth of ecosystems that can include a mix of alien and native species of microorganisms, algae, mollusks, worms, mussels, crustaceans, fish and others.

When global shipping traffic eventually starts to move again, it may become a vector for the spread of alien organisms.

Once established, or naturalised, these alien species can stress native populations and alter habitats, resulting in biodiversity loss. Other outcomes may include public health concerns, particularly if these species can spread diseases.

After biofouling was identified as a severe threat to global biodiversity, the United Nations' International Maritime Organisation released guidelines for the control and management of ships' biofouling to minimise the transfer of non-indigenous species in 2011. Additional guidance has been issued in the years since.

However, there are few vessels without any degree of biofouling, because the process begins just hours after immersion into water, even after biofouling removal or the application of anti-fouling systems, such as special paints.

A vessel's ballast water causes one form of biofouling. But what is more crucial during this pandemic is that Asian waters, which are of central importance for global shipping traffic, are transforming into floating parking spaces for idle vessels, whose hulls are in turn becoming biofouling hot spots.

Native marine species can colonise the hulls of inactive ships and, when global movement resumes, these species will travel to new places.

If they survive the journey, they can detach themselves or their offspring, potentially exploiting niches within these new environments.

Once the species are established, local fleets, floating structures and ocean currents can further spread them.

Similarly, if now-idle vessels arrive with untreated hulls, the already colonising non-indigenous species may spawn or detach.

As we know from history, some marine species will indeed thrive in their new ecosystems, outcompeting locals for food and places to breed.

The story of the Asian green mussel *Perna viridis* offers a sense of how things might go.

After appearing in the waters around Trinidad and Tobago in the early 1990s, this invasive mussel travelled the shipping routes that wired the Caribbean and Atlantic worlds together.

By 2000, it had been found in Jamaica, Venezuela and the US states of Florida, Georgia and South Carolina. As the Asian green mussel established itself within these new biozones, it began to adversely affect the populations of economically important native mollusks while altering local habitats.

Its expansion also causes water-pipe blockage in coastal industrial and power plants and has negative impact on aquaculture.

Management plans and interdisciplinary research can help mitigate the consequences of biofouling.

Vessels need to adjust their biofouling inspection schedules and consider the environmental conditions of the places where they are anchored during their inactivity.

Port cities like Singapore that are central transshipment hubs can offer removal services to assist in managing the effect of biofouling on biodiversity and ecosystem services.

Biofouling removal may also enhance a vessel's hydrodynamic performance – reducing fuel costs and carbon emissions when vessels set sail again.

• Stefan Huebner is senior research fellow at the Asia Research Institute, National University of Singapore.  
• Anthony Medrano is presidential young professor of environmental studies, Yale-NUS College, Singapore. They are working on an interdisciplinary project that examines the history and implications of biodiversity change in Singapore and South-east Asia.

**What is more crucial during this pandemic is that Asian waters, which are of central importance for global shipping traffic, are transforming into floating parking spaces for idle vessels, whose hulls are in turn becoming biofouling hot spots. Native marine species can colonise the hulls of inactive ships and, when global movement resumes, these species will travel to new places.**