

## A look into an invasion



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**A** team of Filipino researchers recently had a rare opportunity to observe a potential biological invasion as it was happening. Observations from scientists working with Manila Ocean Park had shown an increase in the population of a species of mussel not usually found in Philippine waters—a rare early warning sign that the species' invasion of Manila's waters might be imminent.

From these observations a team of researchers from Manila Ocean Park, the University of the Philippines, and the Biodiversity Management Bureau worked together to look into this phenomenon before the invading organisms caused too much harm to local ecosystems.

Even though Manila is one of the most heavily urbanized cities in the world, ecosystems and organisms still establish themselves in different parts of the city. Manila Bay is one of these places, where many species of fish and shellfish can be found. Even in the Port of Manila, the Philippines' biggest port, certain hardier species, including different species of mussel, can thrive.

As the country's biggest port accommodating ships from other parts of the Philippines and from other countries, the Port of Manila is particularly vulnerable to species being introduced into its waters from other regions.

A species brought to a new environment outside its usual range due to human activity is called an introduced species. This is not necessarily a bad thing. Species are sometimes intentionally introduced in a new region to serve as a source of

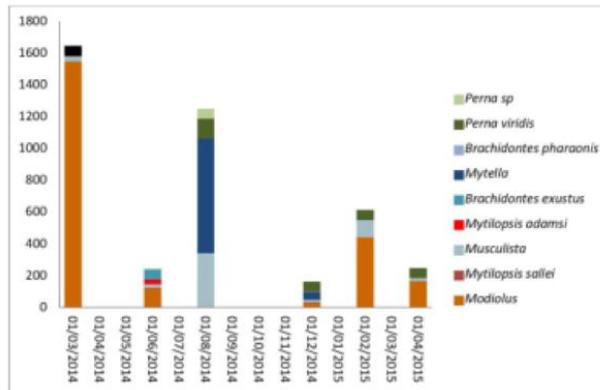
food or to control the population of another species. The tilapia is one example of an introduced species that has since become a staple of Filipino culture and cuisine.

In some cases, however, introduced species can harm ecosystems. By taking up too many resources, introduced species can lead to a decline in the population of other species in an ecosystem. These harmful introduced species are called invasive species. Dealing with them can be difficult because detecting them is often hard until their numbers are great enough to pose a significant threat.

In this case, the introduced species was *Mytella charruana*, a mussel usually found in the waters near Central and South America. A spike in its population in the Port of Manila was detected in 2014. This was significant because the early detection of *M. charruana* in the port meant that scientists were afforded the opportunity to observe this introduced species at the initial establishment of its population.

Opportunity allowed the scientists to construct a picture of how this kind of invasion played out as it progressed and how environmental factors could exacerbate it. A blueprint of this sort is important to have because an invasive species can cause massive harm to existing ecosystems.

Ecological harm can have different effects. Indigenous species such as *Perna viridis*, a species of mussel commonly used for food, are important to local mariculturists, and a species threatening the indigenous species will make producing food and earning a living harder.



The abundance trends of the different species observed during the study.

The study following the original observation of *M. charruana* in 2014 involved sampling the waters of the Port of Manila. Specially designed for sampling species in tropical waters, 17 collectors were placed in the ocean for 16 months. Half of the sampled specimens were collected every two months for analysis and identification, and half were left for the entire duration of the experiment to see how the communities developed. Water conditions, including water temperature and salinity, were also recorded to see how each species reacted to different conditions.

One of the most significant findings, published in the *Philippine Journal of Science* in 2017, showed that *M. charruana* favored less salty waters, much like the aforementioned indigenous *P. viridis*. This means that *M. charruana* will compete for space and resources.

The data also showed that, in Manila Bay, *M. charruana* matured and settled earlier than *P. viridis*, meaning that *M. charruana* has an advantage in that it is able to take up the resources it needs with less competition from other, still maturing, species. This, coupled with its tolerance of a fairly wide range of salinities and higher temperatures and its high reproductive rate, led to the conclusion that *M. charruana* was highly likely to become a harmful invasive species.

The general mechanisms of how invasive species establish themselves in new environments are fairly well known, but the new data give us a rare look into the gritty details of that process, at least in one case.

The data will allow scientists time hopefully to formulate a plan to manage this species before its population grows out of control.

## REFERENCE

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