

Ships Bring Alien Jellyfish Invaders To Our Shores

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Marine environments around the world are being threatened by exotic species of the moon jellyfish being dispersed by international shipping, according to new research.

Using genetic data and computer simulations of ocean currents and water temperatures, researchers from the University of New South Wales and the University of California, Davis, have revealed that the moon jellyfish could not have migrated naturally, according to a report in today's Proceedings of the National Academy of Sciences journal.

By simulating the movement of the jellyfish – of the genus *Aurelia* – over a 7,000 year period the study provides strong evidence that their world-wide dispersal post-dates European global shipping and trade that began almost 500 hundred years ago.

Recent surveys suggest that up to almost one quarter (23 per cent) of all marine species in international harbours are non-indigenous, according to one of the research authors, Dr Mike Dawson of the University of California, Davis.

"Marine organisms traverse the globe in ballast water, on ship hulls and through the trade of exotic species such as tropical fish and this has potential to displace local marine species, threaten ecosystems and cause billions of dollars in damage and preventive control," says Dawson who tracked the invading jellyfish in Japan, California, western Europe and the east and west Australian coastlines.

Introduced species are believed to cost the United States \$122 billion per year. About 3,000 species of marine organisms are believed to travel the world in ships' ballast water each day.

Ships take in water for stability before a voyage and despite preventative measures such as mid-ocean exchange/flushing this 'foreign' water and its contents can find their way into bays and harbours at the destination.

The computer model used to track jellyfish movements could answer similar questions about the migration and introduction of any suspected non-native marine creatures, according to its developers, UNSW oceanographers, Associate Professor Matthew England and Alex Sen Gupta.

"Until now our knowledge of natural and human-assisted dispersal of species has been insufficient to confidently track and predict the spread of non-indigenous marine species," says Professor England.

"Now we have a tool that can include data on currents, geography and the biology of an organism to help separate natural dispersal from that which happens through shipping and trad. It's a pretty sophisticated model and we plan to make it available as a research tool on the World Wide Web."

Discovery: new species of moon jellyfish

The researchers also discovered that there are far more species of moon jellyfish than previously thought.

"We identified 16 species of moon jellyfish, revealing that marine biodiversity is actually much higher than was thought previously," Dr Dawson says, "in retrospect it's easy to see how this wasn't noticed until now."

"When you examine moon jellyfish from locations from around the world they look very similar; it's only when you analyse their DNA as we did, that it becomes obvious that they're very different. This means that traditional methods that compare physical characteristics can benefit from modern techniques such as DNA analysis," he says.

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