

Aliens of the ocean – bizarre and beautiful

They look more like aliens than earth-forms, but according to Professor Russ Hopcroft, the thousands of microscopic marine animals that make up the 'zooplankton' in our oceans, are a critical part of the marine ecosystem, a sensitive indicator of climate change, and a great photographic subject.

Professor Hopcroft is paying a six-month visit to the Australian Antarctic Division as part of a year-long sabbatical from the University of Alaska in Fairbanks, and to strengthen ties with Australian researchers involved in the Census of Antarctic Marine Life – a major Australian-led project of the International Polar Year, which aims to determine the biodiversity, abundance and distribution of marine species around Antarctica.

Professor Hopcroft co-leads a sister project of the Antarctic census – Arctic Ocean Diversity – which will create an inventory of biodiversity in the

Arctic sea ice, water column and sea floor, from the shallow shelves to the deep basins.

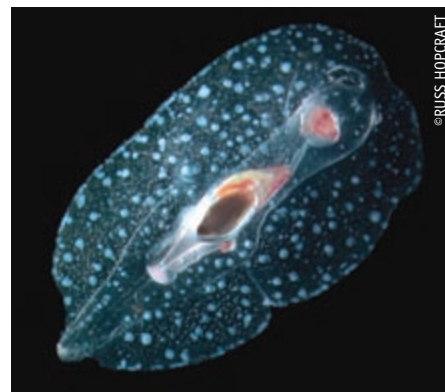
Professor Hopcroft's area of expertise is zooplankton ecology; a profession which has seen him cruising the North Pacific Ocean, Bering Sea, Arctic Ocean, Sargasso Sea and the Caribbean, among others, for samples of his tiny subjects. Many of the organisms he studies in the Arctic are also found around the Antarctic, or are closely related, but there are others he is yet to meet.

'I'm really hoping to get familiar with the animals here and to do some photography,' he said.

Professor Hopcroft started taking photographs of zooplankton four years ago, because of a lack of good quality, publicly accessible photos that showcased the animals' both bizarre and beautiful characteristics.

'It's really hard to get students interested in working with dead, pickled animals that have no colour, behaviour or movement and that are often twisted into unnatural poses,' he observed.

He has since amassed a portfolio of thousands – many of which have appeared in journals, on web sites and in public relations material. All his photos are taken under a light microscope using live animals, which range in size from millimetres to about five centimetres.



This heteropod, *Pterosoma planum*, (a group of predatory pelagic snails) has a thin shell and a mouth with hooked teeth (towards top right of photo). It grows up to 5 cm in size.

'What's really surprised me is that I've received more public interest and recognition of my work from my photographs, than from my science,' he said.

'The photos have really added value to the work I do and help educate people about the importance of these organisms, and a part of the ecosystem that people know so little about.'

Snail-like 'pteropods'* are one group of animals Professor Hopcroft has become good at identifying through his photography. They are also one species more vulnerable to ocean acidification, which is occurring as a consequence of climate change.

Pteropods make shells out of calcium carbonate. However, their ability to form these shells correctly is affected as increasing amounts of atmospheric carbon dioxide dissolves in the ocean, making it more acidic and changing the chemical form of the calcium carbonate available. As zooplankton and other planktonic (drifting) organisms, such as algae, form the base of the food chain, changes in the structure of the planktonic ecosystem will have impacts all the way up the food chain to the fish, penguins, seals and whales.

'It is critical we study the ecosystem over the longer term, to see how climate change is impacting on the zooplankton and other planktonic organisms,' Professor Hopcroft said.

Professor Hopcroft spent the first six months of his sabbatical at the Australian Institute of Marine Science in Townsville. He and his young family enjoyed meeting some of Australia's more charismatic fauna, including wallabies, echidnas, snakes and parrots – quite a change from the moose, bears, Arctic foxes and beavers of his home town, and the alien-like microfauna that consume his working hours.

Wendy Pyper
Information Services, AAD

* Two of Professor Hopcroft's pteropod images are featured on page 24 and in Freeze Frame on page 37.



This amphipod, *Phronema*, is sticking its head of its house – the hollowed out living body of a salp – where it will eventually lay its eggs and raise its family. You thought the movie *Alien* was a wild idea, see any resemblance? These mini crustaceans reach sizes of up to 2 cm.