

MARINE BIODIVERSITY

Marine isopod crustaceans in New Zealand

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Just over 200 species of aquatic isopods – crustaceans related to wood lice – are currently known in New Zealand: this is just the tip of the iceberg.

ISOPODS are familiar to many as the small bug-like slaters that are found in damp spots around the house and in gardens. They are crustaceans, relatives of the shrimps and crabs, and belong to the Peracarida, a group that includes, amongst others, the amphipods (sand hoppers). The land-based forms all belong to the suborder Oniscidea, which has no aquatic representatives. They are widely known as wood lice, pill bugs, sow bugs and slaters.

Common names for marine isopods include sea centipedes, sea slaters, fish lice, kelp lice, sea lice and beach lice. The group is an important component of marine biodiversity and in the deep sea may dominate the bottom-dwelling invertebrate fauna.

Most marine isopods are small (3–10 mm long) and usually hide away during the day then emerge to feed at night. Paradoxically, one of the largest of all crustaceans is the isopod *Bathynomus giganteus*, a deep-water species that reaches nearly half a metre in length. Isopods are morphologically the most diverse of the Crustacea. Often they are robust and compact in form, but body shape varies from worm-like to scale-like, and many deep-sea species have highly ornamented and bizarre shapes. The isopods most familiar to the casual observer are the so-called “sea lice” and “fish lice” (also referred to as tongue-biters and fish doctors) familiar to fishers and anglers. These parasitise many kinds of fishes, and are found attached inside the mouth, on the gills, and on the fins and external surfaces.

Why are isopods important and what do they do?

As major contributors to marine biodiversity, isopods occupy a range of niches. Many species are thought to eat fine organic deposits or seaweeds; others are known to be predators, carnivorous scavengers or micro-predators; some are parasites of fish and crustaceans; and some live in association with corals or sponges.



Aega monophthalma Johnston, a rare micro-predator, previously known only from a few Atlantic records, was recently collected on the Chatham Rise. (Photo: Chris Thomas)

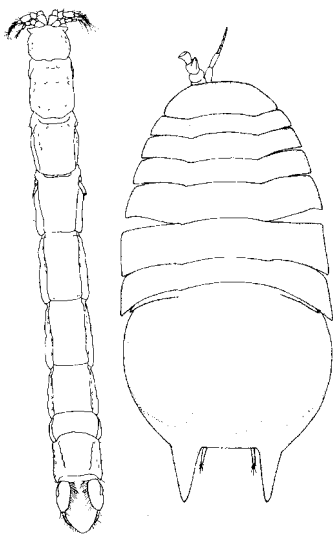
Isopods, in common with other peracarid crustaceans, develop directly from eggs that are held in a brood pouch. Perhaps because there is no larval stage for ready dispersal, many isopods have very restricted and local distributions. This is particularly useful in biogeographical studies, and in characterising regional invertebrate faunas. At present there is no accurate assessment of the biogeographic affinities of the New Zealand marine isopod fauna as there is so little information.

The Cirolanidae: economically important

One family of marine isopods – the Cirolanidae – are scavenging animals which can sometimes swarm in vast numbers and are familiar as pests that attack damaged or dying fish, particularly at dusk or at night. These sometimes voracious scavengers are found in nearly all marine environments. Traps baited with fish have captured tens of thousands of individuals. At times they have been a problem to commercial

Bather alert

CIROLANIDS may occasionally attack humans, although generally this presents more a minor nuisance rather than a real danger. The worst case I know of was a cirolanid attack on a group of divers cleaning jetty pilings in Sydney Harbour. The isopods ate away exposed skin between the facemask and wetsuit hood. Biting isopods are rare and usually restricted to warm waters, and it is unlikely that New Zealand's beaches will experience problems with these usually benign crustaceans.



Examples of New Zealand marine isopods. left: *Haliophasma platytelson* Wägele, a blind, marine species from the continental shelf off western South Island (reproduced with permission from the New Zealand Journal of Zoology); right: *Mastigoniscus pistus* Lincoln, found at depths of 2500 m east of Cook Strait.

Biosecurity concerns

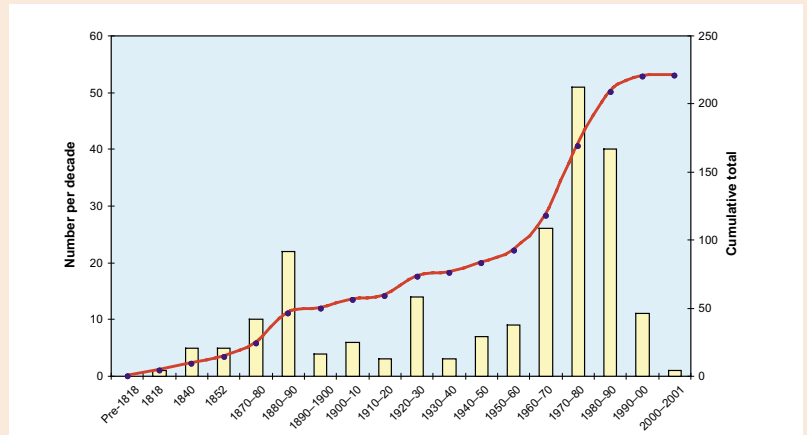
MARINE ISOPODS feature regularly in lists of introduced or translocated species, although only a few species are involved. In New Zealand there is little recent data for introduced marine isopods, with only three species (two are wood-borers) listed recently in *NIWA Technical Report 34* ("Marine adventive species in New Zealand"). The widely translocated species *Cirolana harfordi* and *Paracerceis sculpta* have not been reported from New Zealand harbours. One New Zealand species, *Eurylana arcuata*, is known to have been "exported" to California and eastern Australia.

fishing operations as they damage fish in traps and trawl-nets. For example, cirolanids attacking live and netted sharks have twice caused the collapse of commercial shark fisheries, once in South Australia in the 1930s and more recently in Florida in the 1970s. The catch-spoiling activities of cirolanid isopods were sufficiently well known to nineteenth-century North Atlantic fishermen that charts from that era have areas marked as "lousy ground" to indicate that it was not suitable for fishing. There is little doubt that these animals will swarm in areas of high habitat disturbance, particularly through activities that generate carrion, such as bottom trawling.

Cirolanid scavenging also has its beneficial side: they are veritable garbage cleaners of the sea. Their behaviour has been tapped to clean skeletons for museum collections. These animals must surely have a significant role in consuming the dead and dying in the ocean.

Marine isopods around New Zealand

There are between 9000 and 11,000 named species of isopod worldwide; about 5700 of these are found in aquatic habitats (both marine and freshwater). At the "Species 2000: New Zealand" conference in February 2000 (see *Water & Atmosphere* 8(1): 4), Gary Poore listed all isopod species known from New Zealand, a modest 297, of which 211 are aquatic – just 4% of the world total. This low number reflects not how many species are present in New Zealand's Exclusive Economic Zone (EEZ), but rather the lack of sustained and long-term isopod research in this country. In contrast, the USA and Australia have had few periods without some research activity on isopods, particularly during the twentieth century.



Historically, the major period of isopod documentation in New Zealand was from about 1880 to 1910, when Charles Chilton was actively working, although the number of species named was fairly low. The marine isopod fauna of Australia, which benefited from the sustained activity of resident taxonomists throughout the twentieth century, can claim more than 1000 mostly south-eastern species from an area roughly similar to that of New Zealand's EEZ.

Many species await discovery

Both the local and global figures are likely to be a very small proportion of the real number of species that exist. A preliminary appraisal of one marine family in New Zealand, the Aegidae, indicates a seven-fold increase from 4 to 30 species. Global estimates and extrapolations of isopod diversity range from 50,000 to about a million species. The actual number probably lies somewhere between the two.

With more thorough and sustained sampling of the shallow sub-tidal waters and exploration of deep-water bottoms of New Zealand's EEZ the number of isopod species should increase at least eight-fold. New research in NIWA's FRST-funded "Marine Biodiversity" programme should go some way to providing a better knowledge of these interesting marine animals. ■

Further reading

Bruce, N.L. (1999). About the order Isopoda. In: Debelius, H. (ed.). *Crustacea guide of the world*, pp. 302-306. IKAN, Frankfurt.
 Brusca, R.C.; Brusca, G.J. (1990). *Invertebrates*. Sinauer Associates, Sunderland, Maryland.
 Kensley, B.; Brusca, R. C. (eds). (2001). *Isopod systematics and evolution. Crustacean Issues 13*. A.A. Balkema, Rotterdam.

The number of marine isopods recorded from New Zealand to the year 2000. Red line, cumulative total; yellow bars, 10-year totals.

Eurylana arcuata (Hale), a common intertidal cirolanid scavenger, trapped at Point Halswell, Wellington. (Photo: Chris Thomas)



Teachers: this article can be used for Bio L7 A.O 7.1 (b). See other curriculum connections at www.niwa.co.nz/pubs/wa/resources/

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