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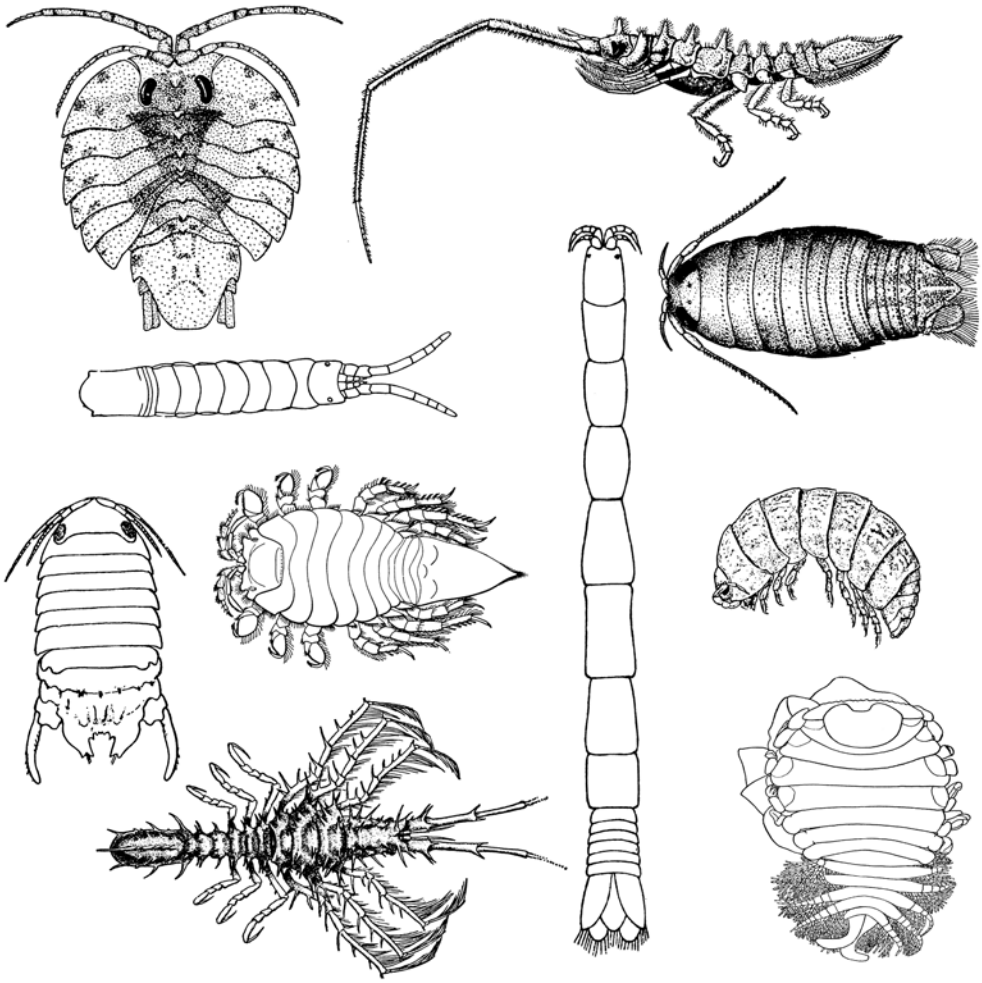
ISOPODS

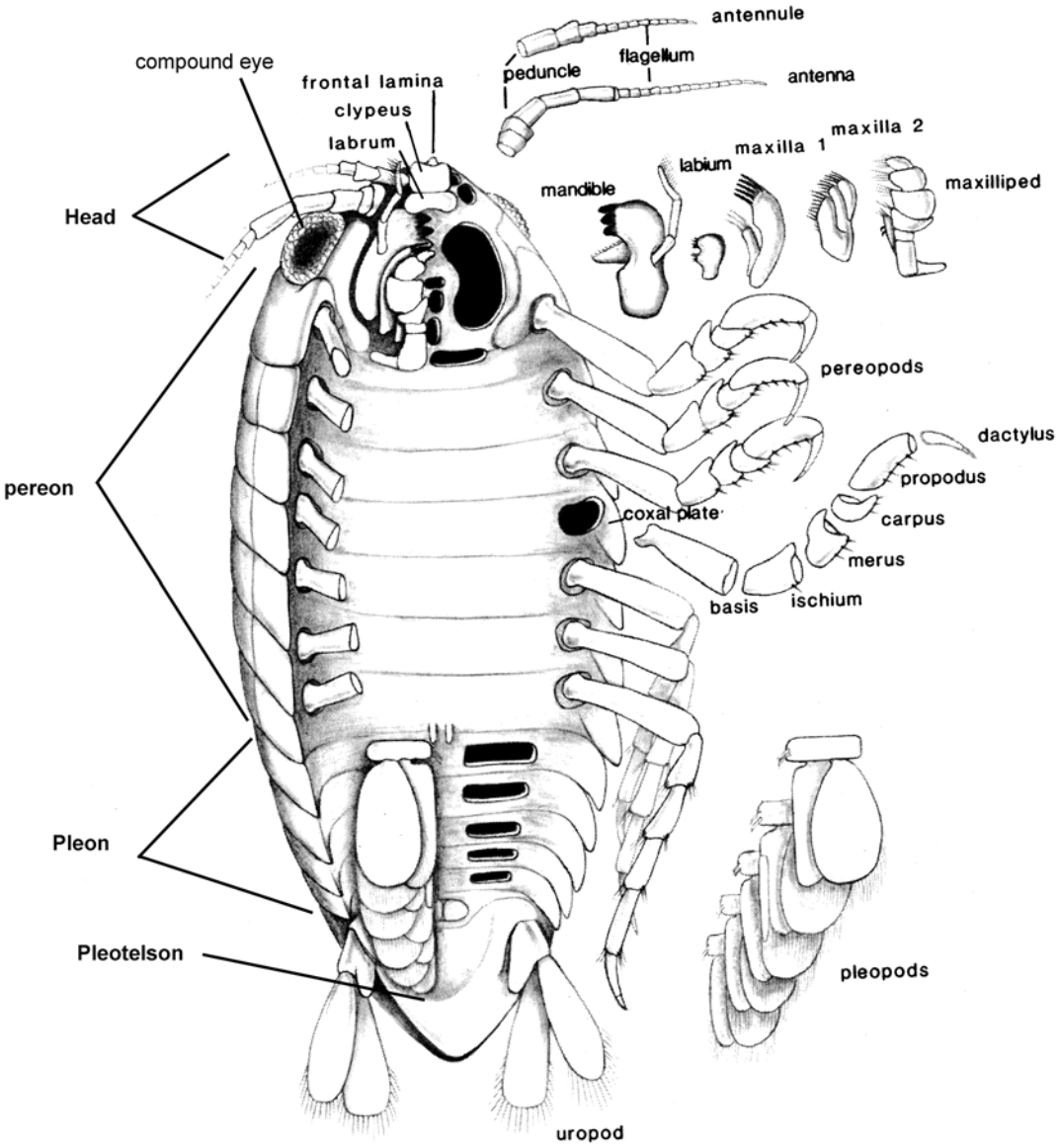
Phylum **Arthropoda**
Subphylum **Crustacea**
Class **Malacostraca**
Subclass **Eumalacostraca**
Superorder **Peracarida**
Order **Isopoda**

What are they?

Isopods are crustaceans. In fact, they are one of the most morphologically diverse of the crustacean groups. They come in many different shapes and sizes (from microscopic to 16 in. long) and live in many different types of habitats (marine and terrestrial). The most familiar isopod to many people (although many people think they are insects) would be the pill bug (sow bug or wood louse), which can be found in any backyard in moist, dark conditions. There are, however, many other types of isopods and most of these live in the ocean. Some are large and spiny and live in the deep-sea, others are very small and live as parasites on fish. There are also many more that live in coastal and shelf waters, moving around on the sea floor and in plants.



As you can see, often isopods do not look alike, however, they do all have some things in common (it's what makes them isopods!): They don't have a **carapace**, have a compact head with two pairs of **antennae** and a **compound eye**; mouthparts comprised of a pair of **maxillipeds**, two pairs of **maxillae** (maxillas 1 and 2 or maxillules and maxillae) and a **mandible**; a **pereon** (body) consisting of seven **pereonites**, bearing seven similar pairs of **pereopods** (walking legs); no claw on their first pereopod (leg); a short abdominal section composed of the **pleon** (of six somites or pleonites) and **pleotelson** (fusion of last pleonite(s) to telson); possession of a single pair of unjointed **uropods;** undergo biphasic molting (where the posterior end of the body molts before the anterior half).



The Basic Isopod Body Plan After: Kensley and Schotte, 1989.

Distribution:
There are around 10,000 species of isopods, both marine and terrestrial. These are diversely distributed worldwide, with species inhabiting shallow inshore to deeper shelf and ocean basin waters and from coasts to deserts.

Those species that live in the oceans are able to do so by using their **pleopods** to 'breathe' by gas exchange. Those that live on land have developed their **pleopods** to include air sacs called **pseudotrachea** that function as gas exchange organs that don't need to be fully submerged in water.

Life History:
As isopods are a diverse group, their life spans also differ and can vary from less than a year to a few years in total. Reproduction occurs when the female molts, usually the female will have been guarded or carried by a male until she molts. Sperm is transferred from the male to the female through the female genital duct. Some species of isopods release the fertilized eggs into a brood chamber (or marsupium) where they are protected until they are mature enough to be released, other species brood their eggs internally. Isopods are never released as larvae, like crabs and shrimp; instead they are released as juveniles (or mancas) and are easily distinguishable from adults by their small size and by their possession of only 6 pereonites (body segments).

There are a few different feeding strategies used by the many groups within the Isopoda. Some are opportunistic feeders and will scavenge, feeding on detritus and other dead matter (fish, crustaceans); others are predators and will actively capture prey with their anterior legs or mouthparts. Some are parasites and can be found permanently attached to the gills, skin or mouths of fish; others graze on plants or bore into wood.

Some Case Histories: marine isopods

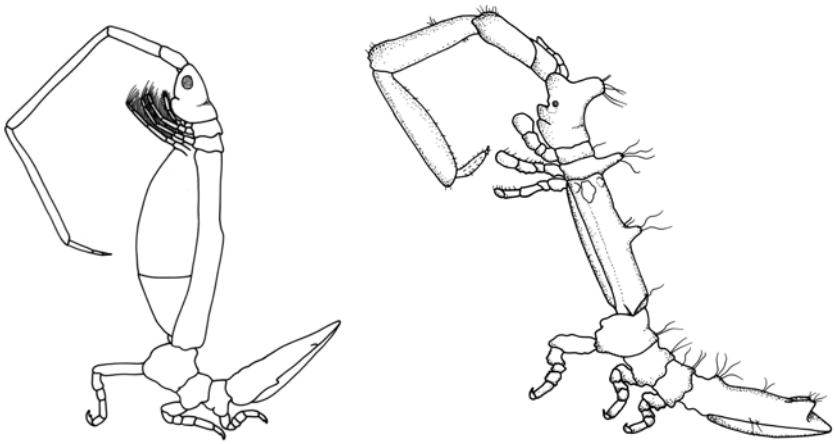
The largest isopod species are those from the genus *Bathynomus*. One species, *Bathynomus giganticus* can be found off the Gulf of Mexico and the South Atlantic coast of the United States at 4000 ft in depth (~1000 meters). It can grow up to around 11 inches (280 mm) in length and is usually caught in baited traps, which it will enter to scavenge fish carcasses.

Photo: From NOAA Ocean Explorer Expedition to the Gulf of Mexico
(showing the underside of the animal)

Some species of isopods live parasitically on fish. One particular group (cymothoid isopods), known as 'tongue biters', lives inside the mouths of fish and essentially replaces the tongue. Scientists believe that cymothoid isopods generally hook their pereopods (legs) into the tongue of the fish at its base and the tongue eventually falls off, leaving room for the isopod to live (see picture). It is thought that the actions of the isopod do not affect the fish's lifespan! Some species do live off the blood of the host fish but others feed off the mucous within the fish's mouth.

Cymothoid isopod living within the mouth cavity of a fish.

The arcturid isopods (Family Arcturidae) are isopods that have developed a unique body morphology enabling them to live as passive filter feeders among plants and plant-like (in structure) animals such as bryozoans and sponges. In arcturids, the posterior pereopods (legs) are adapted for clinging while the anterior pereopods are long and hold rows of long setae (hairs). Their bodies are often elongated at the fourth segment so that they are able to tilt upwards and get their anterior legs higher in the water column (for more food). They swish their anterior pereopods around, collect small food particles out of the water and send them to the mouthparts.



Arcturid Isopods: *Neastacilla monoseta* and *Parastacilla tingara*

References and keys to isopods:

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Menzies R.J. and Frankenberg D. 1966. ***Handbook on the common marine isopod Crustacea of Georgia***. University of Georgia Press, Athens. 93 pp.

Guide to the Coastal Isopods of California
http://tolweb.org/tree/eukaryotes/animals/arthropoda/crustacea/isopoda/accessory/caguide/caguide.html

Crustaea.net Key to the Australian Families of Isopoda
http://www.crustacea.net/crustace/isopoda/index.htm

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A key to the Freshwater Genera of Isopods of North America:
Covich, A.P. and J.H. Thorp. 1991. Crustacea: Introduction and Peracarida. pp. 677-689. (in) Thorp, J.H. and A.P. Covich (eds.) *Ecology and Classification of North American Freshwater Invertebrates*. Academic Pres Inc., San Diego. 911 pp.

Keys to the families of Terrestrial Isopods (In Portugese)
http://www8.ufrgs.br/zookey/itrs/ITRS_class.asp

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http://oceanexplorer.noaa.gov/explorations/02mexico/logs/oct13/oct13.html