

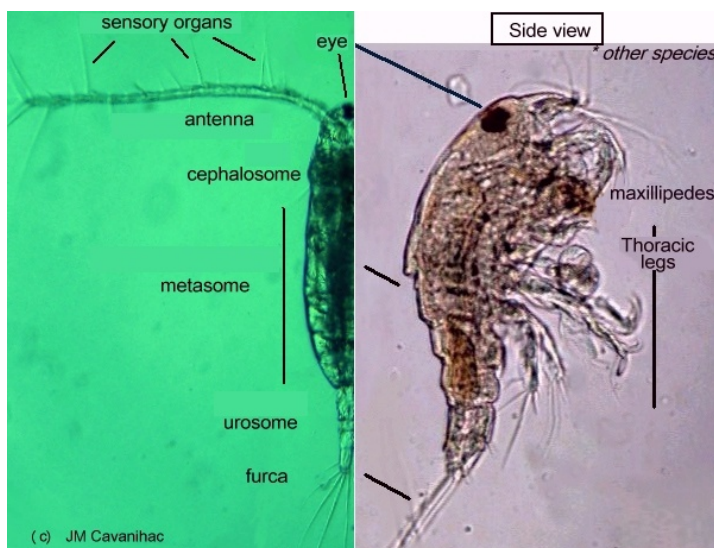
# MARINE COPEPODS \* by J.M. CAVANIHAC – FRANCE

*\*Mirrored article in French at Microscopies.com*

Copepods are particularly interesting for many reasons: for example they are one of the key food resources for fish and even some whales: they have a great importance in the food chain from phytoplankton to fishes because we too are at the top end of the chain!

Another aspect of interest to us, as amateur microscopists, is their relative abundance in marine samples and the variety of species we can catch.

The name Copepod comes from the Greek: *Kope* = oar and *podos* = foot. Indeed their thoracic legs are connected in pairs and used to swim with quick movements. Below are shown the different parts of the body. The righthand picture is the side view of another species.



Species are numerous, probably more than 10000 (only one quarter of them is known!) and nine or ten orders exist (according to specialists). Precise identification can be difficult because identification is based only on the appendages (legs, antenna) and often require dissection. Besides, in the same sample, adult and young forms coexist: indeed, from hatching they show 5 or 6 Nauplius stages, then 6 stages in the copepodic form up to the adult. In the same sample you can find 11 or 12 different stages of the same species!

The male and female can show some differences: one of the most spectacular in some species is the 5th pair of thoracic legs modified to provide a claw on one side (righthand image below): the picture shows an old stained specimen preserved for 10 years in glycerine jelly on the slide! The claw detail has been manually «cleaned» with software to make details more visible!



NB: All the other pictures show fresh and living specimens. They become opaque when fixed in formalin.

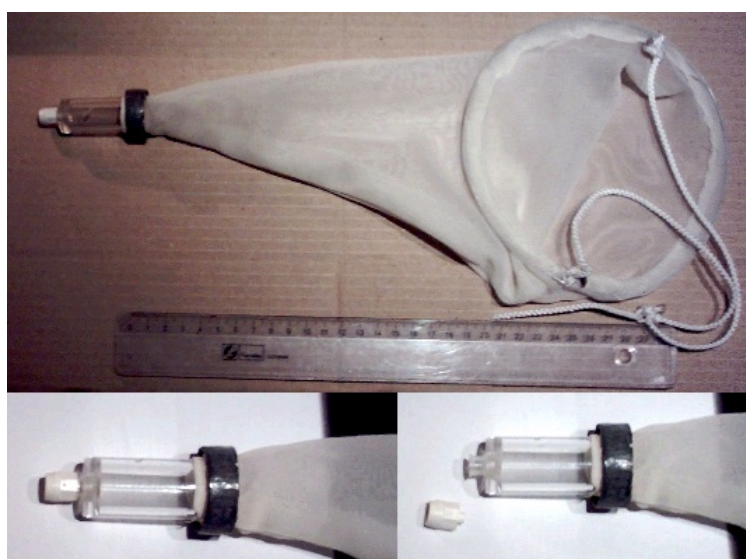
Below are some pictures of nauplii: hatching is shown in the first picture upper left. Species identification is almost impossible during nauplius stages.



I am not a taxonomy specialist and there may be some errors in my tentative identifications! I accept beforehand all suggestions the readers can offer to help me!! The main intention of this article is to show the great diversity of forms encountered.

All picture are of marine copepods, but some freshwater species exist too: like cyclops and diaptomus.

Capture is made with a plankton net: just a thin conical curtain tissue 30 cm long fixed on a metallic circle. At the end of the net is glued the tip of a 50 cc syringe with its removable plug, which is very convenient to transfer the contents into a jar. A lead ring is useful to maintain the net near the bottom of the water column. Mesh size is around 200 µm (0,2mm). Some studies seem to suggest that a small net aperture can be an advantage to collect of the slower species. Samples are made between 0 and 5 meters deep (0 to 15 feet). They are mainly collected from Etang de Thau (a large saltwater pond in the south of France).

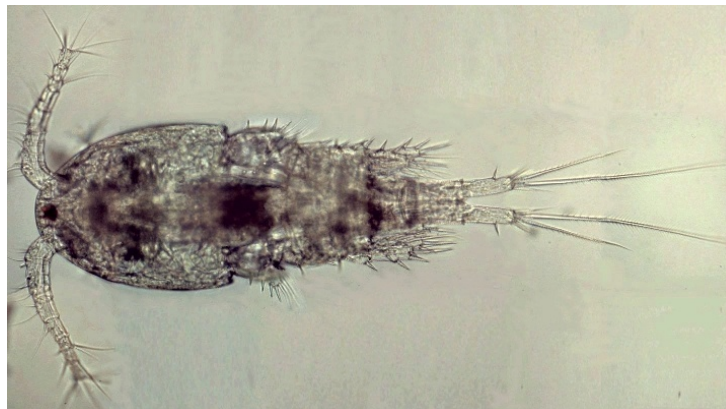


The size of individuals, is typically between 0,5 and 2 mm, which allows them to be seen with the naked eye in the jar. If you see too many copepods in the sample it's useful to dilute it with marine water, and divide between several jars, with a large opening to for oxygenation.

One of the most frequently encountered species are Calanoïds, (Calanus: picture below darkfield and Rheinberg lighting ). Marine species only.



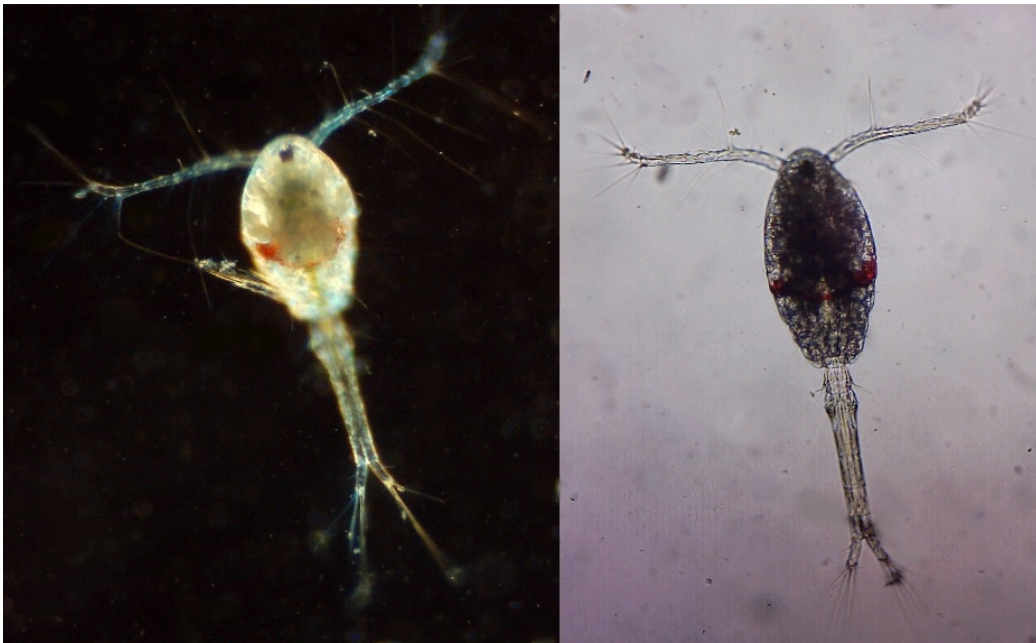
Other common species: cyclopoïds, (Cyclops) marine, is shown here, but some freshwater species exist too.



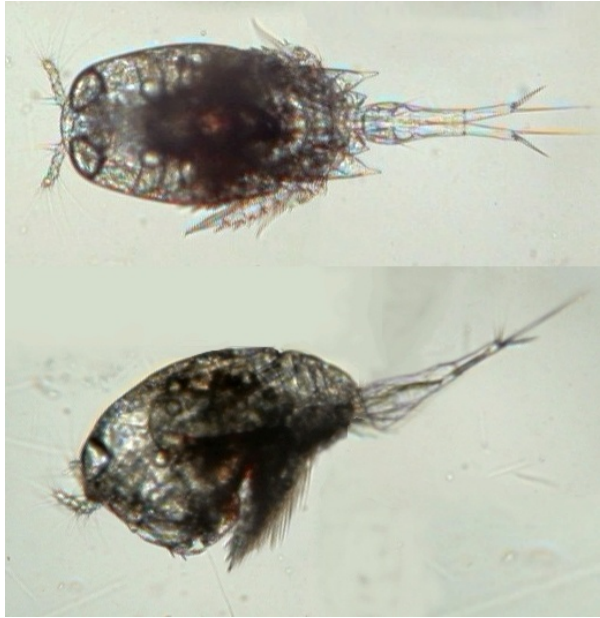
Often the female specimen carries two sacs with eggs inside. Here is an example with detail of eggs. Note eye spot on the lowest egg.



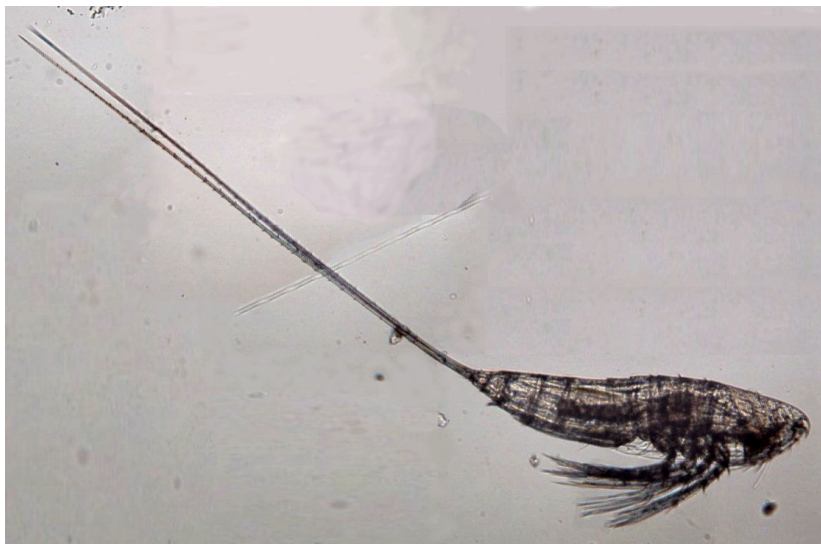
Another species: Oithona (I think!) in darkfield and Rheinberg / bright field (not the same specimen in the two images):



Corycaeus: the two large eyes lens are clearly visible. Same specimen in top and side view ;



Another specimen: Macrosetella: it's the only specimen I have encountered in several years collecting (black and white picture)



With Rheinberg lighting, a parasitic copepod of fish probably Caligus: Here too, the only specimen I have encountered.



I don't know the species of this one carrying its eggs but may be Siphonostomatoïda. Note the large size of the eggs. It moves very quickly in the sample!



Thoracic legs are often difficult to see on a living specimen: the image below shows details of them on a preserved copepod (stained with eosin)



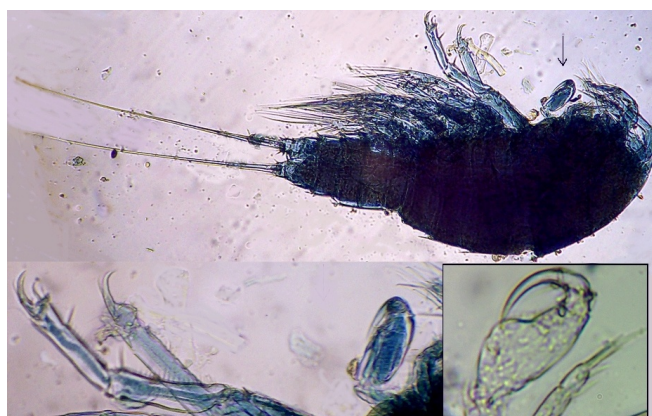
The following specimens are difficult to identify for me: the first one may be: *Arcatia tonsa*:



Another unknown (for me!):



Copepods feeding is difficult to study, but some species have maxillipedes near the mouth and probably use them to catch food in the feeding process. Picture below (arrow):



And to conclude, here is a very interesting and rich site about marine copepods and classification with descriptive boards:

Razouls C., de Bovée F., Kouwenberg J. et Desreumaux N., 2005-2011. - *Diversité et répartition géographique chez les Copépodes planctoniques marins.* © copyright 2005-2011 CNRS, UPMC  
LINK : <http://copepodes.obs-banyuls.fr>

Comments to the author are welcomed. Email - micromars1 AT orange DOT fr

Published in the January 2012 issue of Micscape Magazine  
[www.micscape.org](http://www.micscape.org)