

Parasitic Dinoflagellates in Mediterranean Zooplankton

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Introduction

Numerous dinoflagellates are parasites of marine zooplankton organisms and have been observed to be able to control populations of certain zooplankton species. Most of our present knowledge of these parasites is attributable to the work made by Édouard Chatton in the first half of the 20th century. Since then a handful of studies have dealt with the ecology and occurrence of parasites in marine zooplankton, but in general our understanding of this phenomenon is limited.

Here is presented new information on the morphology of one of the most common parasitic dinoflagellates in copepods, *Blastodinium*, including preliminary data on the occurrence of selected parasites in zooplankton collected off Barcelona in 2003-2004.

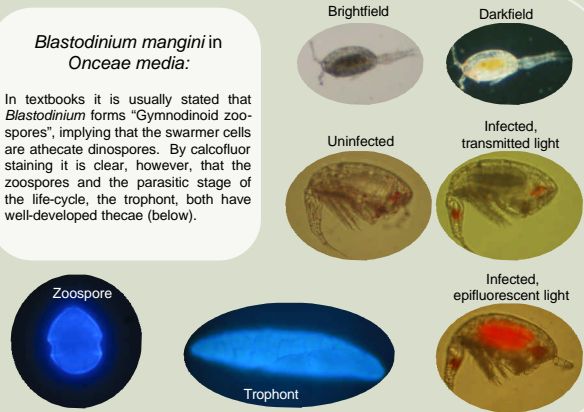
How are the parasites recognized?

Most likely, parasites (and in particular endoparasites) in zooplankton are often overlooked. This may in part be due to a low prevalence of parasites, but it is also a fact that the parasites are not all easily identifiable in routine zooplankton monitoring.

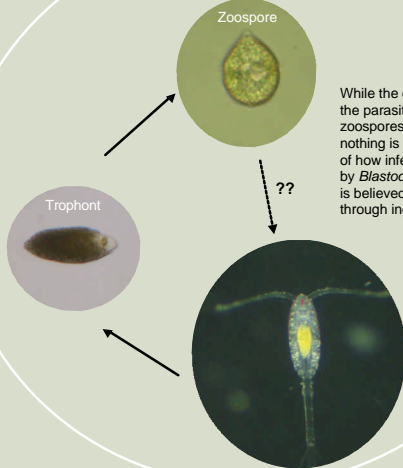
For example, to distinguish *Blastodinium* in a copepod in a fixed sample, it needs to have been stored cold in darkness for the chlorophyll – and thereby the distinctive colour – of the parasite to be preserved well. One can also observe live animals or dissect the copepods, but these methods are rarely used on a routine basis.

Blastodinium mangini in *Oncaea media*:

In textbooks it is usually stated that *Blastodinium* forms "Gymnodinoid zoospores", implying that the swarmer cells are athecate dinospores. By calcofluor staining it is clear, however, that the zoospores and the parasitic stage of the life-cycle, the trophont, both have well-developed thecae (below).



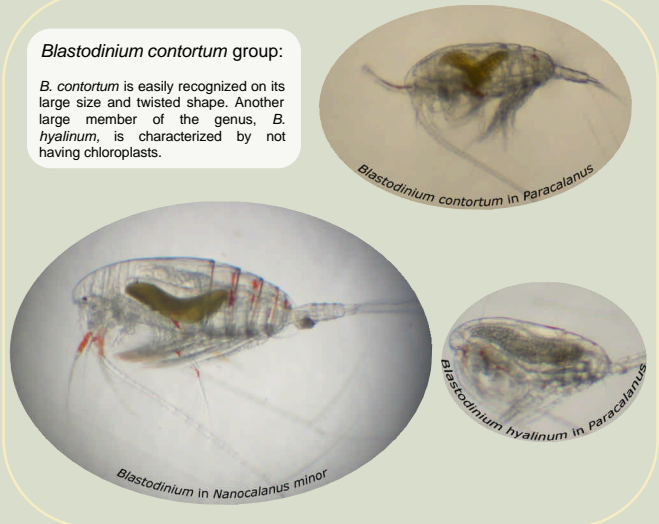
Blastodinium oviforme in *Oithona similis*



While the development of the parasite and release of zoospores is well described, nothing is known with respect of how infection of a new host by *Blastodinium* occurs – but it is believed that infection occurs through ingestion of a zoospore.

Blastodinium contortum group:

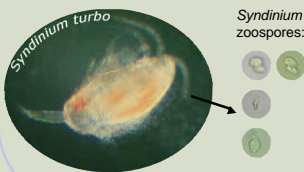
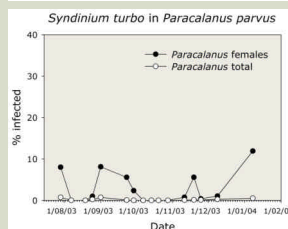
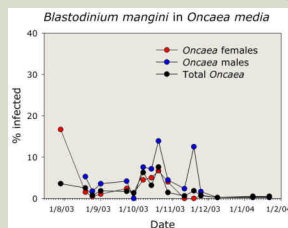
B. contortum is easily recognized on its large size and twisted shape. Another large member of the genus, *B. hyalinum*, is characterized by not having chloroplasts.



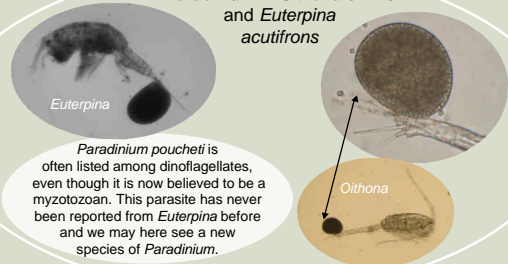
Infection frequencies

Blastodinium mangini was the parasite most commonly encountered. It was observed during summer and autumn, but was almost absent during winter.

Syndinium turbo (in *Paracalanus parvus*) was seen sporadically from summer to winter.



Paradinium in *Oithona similis* and *Euterpina acutifrons*



Paradinium poucheti is often listed among dinoflagellates, even though it is now believed to be a myxozoan. This parasite has never been reported from *Euterpina* before and we may here see a new species of *Paradinium*.

Oodinium poucheti is a dinoflagellate parasite of the appendicularian *Oikopleura*. This parasite was found only in summer where up to 17% of the *Oikopleura* population was infected (August 2003).