

RESEARCH INTO THE DISTRIBUTION OF THE GENUS *BATHYPOREIA* (CRUSTACEA, AMPHIPODA) BY MEANS OF MOLECULAR MARKERS

Demaerel Virginie, Steven Degraer, Magda Vincx and Thomas Remerie

Ghent University, Marine Biology Section, Krijgslaan 281-S8, 9000 Gent, Belgium
E-mail: virginie_demaerel@hotmail.com

The taxonomic identification of amphipods is complex and often a great expertise is required to get to the right species identification (Costa *et al.*, 2004). A lot of recent studies, using molecular techniques, have highlighted that biodiversity can be strongly underestimated when based only on morphological identification. Genetic study of morphological identical species showed that these can be genetically very divergent, which leads to the recognition of so-called cryptic species (Knowlton, 2000).

The present study focused on species of the genus *Bathyporeia*, which is one of the most problematic taxa concerning species identification (d'Udekem d'Acoz, 2004). The general objective of this study was to get insight in the degree of genetic structuring between and within species of this amphipod genus. For this purpose, intertidal and subtidal samples from the most common *Bathyporeia* species (*B. pilosa*, *B. sarsi*, *B. pelagica*, *B. elegans* and *B. guilliamsoniana*) were collected along the French-Belgian-Dutch coast. These samples were analysed using DNA sequencing information from the mitochondrial cytochrome oxidase I (COI) gene and the Internal Transcribed Spacer (ITS) from ribosomal DNA.

Both molecular markers (COI and ITS) revealed a clear phylogenetic separation between the five species. The evolutionary patterns within the genus could not be easily resolved since the positions of the different clades were not supported by high bootstrap values. The intraspecific diversity within *B. guilliamsoniana* appeared to be very high. The phylogenetic analysis showed the presence of two distinct *B. guilliamsoniana* groups supported by high bootstrap values. The degree of sequence divergence within this species was also much higher compared to the other species, suggesting that both distinct *B. guilliamsoniana* groups could be recognized as two subspecies or two (cryptic) species.

In general, the intraspecific degree of haplotype diversity (h) tends to be higher for the subtidal species (*B. guilliamsoniana*, *B. elegans*) than for the intertidal species (*B. pilosa*, *B. sarsi*, *B. pelagica*). This might be linked to the higher stability of the subtidal habitat of these species. For the intertidal species *B. pilosa* and *B. sarsi*, the genetic diversity in the populations Cap Blanc Nez and De Panne was much lower compared to other locations. For both locations, a significant negative Tajima's D value was observed, suggesting that a bottleneck or selective sweep could explain this lower diversity.

When comparing the degree of genetic diversity and structuring within both intertidal species *B. pilosa* and *B. sarsi*, the latter seemed to be more diverse. Although only a limited number of *B. pilosa* specimens were analysed, a significant geographic structuring could be found between the populations of Cap Blanc Nez and De Panne. In contrast, the analysis of the variation between *B. sarsi* populations showed a more

moderate (non-significant) degree of genetic structuring. This could mean that in general *B. pilosa* populations are more isolated than *B. sarsi* populations. A possible explanation for this pattern could be found in the different zonation of both species on the beach. *B. pilosa* occurs strictly on the highest part on the beach in a less wide zone compared to *B. sarsi*, what means that during high tide they are less long under water and hence get less time for horizontal dispersion.

References

- Costa F.O., M.R. Cunha, T. Neuparth, C.W. Theodorakis, M.H. Costa and L.R. Shugart. 2004. Application of RAPD DNA fingerprinting in taxonomic identification of amphipods: a case-study with *Gammarus* species (Crustacea: Amphipoda). *Journal of the Marine Biological Association of the UK* 84:171-8.
- D'udekem d'Acoz C. 2004. The genus *Bathyporeia* Lindström, 1855, in western Europe (Crustacea: Amphipoda: Pontoporeiidae). *Zoologische Verhandelingen*. 162p.
- Knowlton N. 2000. Molecular genetic analyses of species boundaries in the sea. *Hydrobiologia* 420:73–90.