



## A holistic re-interpretation of the phylogeny of the Pycnogonida Latreille, 1810 (Arthropoda)\*

ROGER N BAMBER

The Natural History Museum, Cromwell Road, London SW7 5BD, United Kingdom  
E-mail: R.Bamber@nhm.ac.uk

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### Abstract

The internal and external relationships within the Class Pycnogonida are rationalized based on the entire history of whole-animal understanding, detailed morphometrics, the fossil record, larval structure, mathematical multivariate analyses, and molecular analyses (electrophoretic protein and DNA). The pre-Jurassic fossils are placed in separate orders, with the Lower Silurian *Haliestes* giving the clearest indications of the form of a hypothetical “protopycnogonid”. Living forms, together with some Lower Devonian and the Jurassic fossils, are retained in the Order Pantopoda. No relationships to other Classes of the Arthropoda are yet indicated, and the concept of the Pycnogonida as a sister group to the Euarthropoda is maintained.

The Pantopoda are divided into two suborders, isolating the Austrodecidae. The remaining taxa are classified into six superfamilies, on a consensus of overall morphological trends, larval forms, and the findings of the only previous comprehensive morphological multivariate analysis, and recent molecular analyses. The Colossendeidae, Pycnogonidae and Rhynchothoracidae are isolated within their own superfamilies. The Ammotheidae *sensu lato* is subdivided (within one superfamily), unfortunately leaving a number of genera *incertae sedis*. The Nymphonidae, Callipallenidae and Pallenopsidae are associated within another superfamily. The Jurassic fossils are placed within the Endeidae within a superfamily together with the Phoxichilidiidae, while some Lower Devonian fossils remain *incertae sedis*. Diagnoses are given as appropriate where possible.

**Key words:** Pycnogonida, Pantopoda, phylogeny, sea-spiders, classification