

ALTERNATIVES IN MALACOSTRACAN EVOLUTION

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SUMMARY

The Malacostraca appear to have been derived from epibenthic ancestors with many caridoid features. Despite their very long palaeontological record the Phyllocarida differ in so many respects from the basic eumalacostracan morphological and functional plan that they are regarded as unlikely ancestors and more probably an early diverging branch.

The general morphology of the malacostracan cephalothorax and carapace is discussed and it is shown that the concept of a maxillary segment carapace common to all Crustacea is not valid. The malacostracan dorsal shield is produced by a fusion of terga and a free carapace fold is sometimes formed at its posterior margin.

Some functional systems of the various caridoid Malacostraca are discussed. Attention is drawn to the unsolved problem of secondary segmentation after the alleged loss of a cephalothorax, e.g. in the Syncarida.

The unsatisfactory status of the diagnosis of the superorder Peracarida is pointed out and a revision recommended.

Introduction

Since Calman (1909) presented his views on the 'caridoid facies' and the 'generalised malacostracan' the position of a crustacean of this general type as ancestral to the Malacostraca has remained practically unchallenged, accepted also by more recent revisors (Siewing, 1956, 1963; Fryer, 1964). Nevertheless certain observations, old and new, are not easy to reconcile with this traditional concept of the ancestral caridoid.

Similarly, the higher systematics of the Malacostraca proposed by Calman (l.c.) has remained unshaken and as far as its fundamentals are concerned is likely to remain so. Recently, however, the position of the Hoplocarida within the framework of this system has been questioned by Schram (1969). The current definition of the Peracarida, too, appears more and more unsatisfactory (Dahl and Hessler, 1982).

The aim of the present paper is to focus attention on a number of areas within which a fresh evaluation of current interpretations appears desirable.

Diagnostic features of the Malacostraca

Malacostracans have stalked eyes with a unique neuronal pattern, biramous antennules, tagmatisation of the postcephalic body, fixed number of segments, fixed position of gonopores, respiratory thoracopod epipods, and natatory pleopods. These characteristics are shared by less derived members of all four eumalacostracan superorders and by the leptostracans. The position of the Malacostraca as a natural taxon is secure.

The Eumalacostraca are further defined by the presence of ambulatory endopods and natatory exopods on the thoracopods, as well as by fan-shaped uropods.

Many of the traits enumerated above are more or less typically caridoid. There can be little doubt that Crustacea with these basic morphological traits were originally epibenthic swimmers and walkers.

Cephalothorax and carapace in the Malacostraca

The presence of a cephalothoracic shield is a prominent feature of the typical caridoid. This shield is often referred to as the 'carapace' but this is not wholly correct.