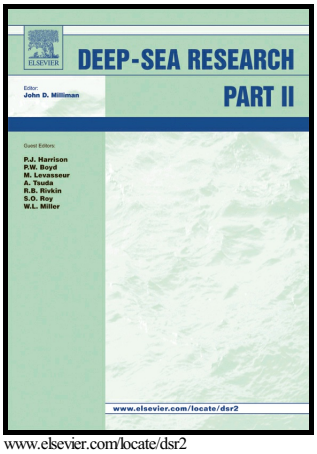

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ABSTRACT

Five major taxa of shrimp-like eucarid are recognized: the order Euphausiacea, the suborder Dendrobranchiata, and three infraorders of the suborder Pleocyemata (Caridea, Procarididea, and Stenopodidea). These animals are very successful in the colonization of the pelagic but the role of the sexual structures (the appendix masculina and the petasma) in this process remains uncertain. We revise the vertical distribution of pelagic species and genera within the shrimp-like eucarids and the presence and types of the male copulatory organs. We further test the hypothesis that the pelagic habitat is associated with the elaborated male copulatory organs and discuss possible mechanisms of association. We also consider possible effects of the depth and coastal factors. In the turbulent and fluid pelagic, successful copulation depends on the perfect fixation and possible stimulation of mates during spermatophore transfer and thus on the development and elaboration of the copulatory structures. The presence of the appendix masculina is necessary for copulation in the pelagic and thus for colonization of the pelagic. The 'family success' in colonizing the pelagic depends on the presence of the elaborate petasma, whilst the 'species success' is not so obviously related to the presence of this organ. The colonization of the water column by the eucarids may basically occur at the family level and be associated with the elaboration of the petasma. Within monophyletic pelagic groups, a greater development of the petasma is observed in the epi- and mesopelagic; some reduction of this organ in the bathypelagic may be related to the reduction in current velocities and turbulence. Simplification of the petasma is also observed in coastal waters. The proposed hypothesis is invariant to phylogenetic models and suggests an explanation to why (but not in which consequence) the elaborated copulative organs have been developed/retained in the pelagic or reduced/lost in the benthic.

Keywords: planktonology, vertical distribution, crustacean morphology, adaptive morphology

sub-theme

Biodiversity and ecosystem functioning