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Nucleus patterns of zoea I larvae (Crustacea: Decapoda) in the context of taxonomy

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Abstract

Using DAPI as a nucleus marker, we studied zoeas of 6 decapods (*Palaemon adspersus* Rathke, 1837; *Palaemon elegans* Rathke, 1837; *Porcellana platycheles* (Pennant, 1777); *Pisidia longicornis* (Linnaeus, 1767); *Xantho hydrophilus* (Herbst, 1780) *Xantho pilipes* A. Milne Edwards, 1867) representing one species pair of Palaemonidae (Caridea), Porcellanidae (Anomura) and Xanthidae (Brachyura) each, with special reference to the telson, and correlated our observations with the general morphological features of the zoeas.

The different taxa exhibit specific features with respect to the distribution of nuclei, the patterns they exhibit, their size, density and numbers, thus being sets of characters potentially useful for taxonomic descriptions and diagnoses especially on the "above-species"-level. We discuss how nuclear patterns and classical morphological and/or morphogenetical features normally examined in zoeal larvae are related, and give some ideas on how "nucleus"-characters can contribute to taxonomic descriptions.

Key words: Zoea, DAPI, pattern, taxonomy, description (Decapoda)

Introduction

DAPI, a universal nucleic acid fluorescence dye (Kubista *et al.* 1987), is a popular marker for nuclei in a wide set of applications, e.g. mapping nuclei or giving evidence of the cellular composition of samples. This does not only account for organisms with well permeable body walls, but also for small arthropods, where DAPI can even be used as a vital marker in single dye preparations as well as a background stain for neuronal markers (Wohlfrom & Melzer 2001). Our preliminary tests showed that this is also possible in zoeal larvae of decapod crustaceans, and that mapping of nuclear features may reveal taxon-specific differences. In order to check the relevance of this method for comparison and diagnosis of different taxa, we therefore analysed the telsons of DAPI stained zoeal larvae of six different decapods with respect to nucleus distribution, patterns, size, density and numbers.

The studied zoeas represent three species pairs with the representatives of each pair belonging to the same or closely related genus, and one pair each represents the three infraorders Caridea (Palaemonidae: *Palaemon adspersus* and *Palaemon elegans*), Anomura (Porcellanidae: *Porcellana platycheles* and *Pisidia longicornis*) and Brachyura (Xanthidae: *Xantho hydrophilus* and *Xantho pilipes*). Detailed descriptions of the external morphology of the zoeas of these species are available: The *Palaemon* zoeas were described by Fincham (1977, 1985, 1986), those of *Porcellana* and *Pisidia* by Barnich (1995) and Gonzales-Gordillo *et al.* (1996), and those of the *Xantho* by Ingle (1983), Paula and Dos Santos (2000), and Meyer *et al.* (2004).

The combination of both very closely related species and representatives of different infraorders should allow to infer on which taxonomic level the observed features might be relevant. Apart from this, we seek to reveal in which way the commonly studied characters of zoeas are correlated with nucleus pattern, and what might be the potential use of these features in the context of taxonomy, hence adding this approach to the stock of species description techniques available for zoeas or small arthropods in general, such as scanning

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