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The rare subgroup C1 of *Marphysa* (Polychaeta, Eunicidae): re-description of species and first records in the Mediterranean Sea

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Abstract

Marphysa is one of the largest genera in the family Eunicidae, containing 76 valid species. However, among them there are only five species that share the diagnostic characters of having only composite falcigers in inferior setae and branchiae confined in the anterior body. These species are relatively rare and less described while in their original descriptions their differentiation is mainly based on features believed to be age-specific today. In this study, the type-materials of *M. adenensis*, *M. purcellana* and *M. gemmata* have been re-examined and re-described with illustrations. For *M. adenensis*, new material from the Mediterranean Sea was also examined, where this group has not been recorded up to date. The above species were compared to each other and new differential characters are being highlighted. A revised key for the *Marphysa* species found in the Mediterranean is also provided.

Key words: *Marphysa adenensis*, *Marphysa purcellana*, *Marphysa gemmata*

Introduction

The family of Eunicidae Berthold, 1827 is one of the largest polychaete families (Fauchald 1970). To date, the genus *Marphysa* Quatrefages, 1865 alone contains 76 valid species (Fauchald & Bellan 2013) and there are several being recently described. The diagnostic features of the genus that were traditionally considered most important can be summarized as having five prostomial appendages, but no peristomial cirri. According to a wide review of the genus by Fauchald (1970), all species can be grouped based on the type of composite setae present and then subdivided by the distribution of the branchiae. Therefore, four major groups were distinguished: Group A that includes species with no composite setae present, Group B with only composite spinigers present, Group C with only composite falcigers present and finally, Group D with both composite falcigers and composite spinigers present. Each of these groups can be further divided into species having branchiae on a limited anterior region (Subdivision 1, e.g. Group C1), or over a long region of the body (Subdivision 2).

However, recent studies have proved that the presence of the different types of composite setae along the body can vary to some extent in the same species with age. For example, Lu & Fauchald (1998) observed that in *Marphysa bellii oculata* Treadwell, 1921 (which belongs to group D), the presence of composite falcigers range from very abundant all along the body in young stages, to limited at only posterior setigers in old stages. Nevertheless, morphology of setae varies along the eunicid body in a structured way (Zanol *et al.* 2014; Fauchald 1992) and therefore, apart from presence/absence of specific types, distribution patterns in respect of age stages should be considered in diagnosis.

The species of *Marphysa* recorded in the Mediterranean Sea to date are *Marphysa bellii* (Audouin & Milne Edwards, 1833), *Marphysa fallax* Marion & Bobretzky, 1875 and *Marphysa cinari* Sahin, 2014 that belong to Group D; *Marphysa kinbergi* McIntosh, 1910 and *Marphysa sanguinea* Montagu, 1815 that belong to Group B. Past records of *Marphysa disjuncta* Hartman, 1961 in the Mediterranean Sea are considered doubtful (Sahin 2014).

Recent sampling surveys (2009–2013) included in this work, at the Eastern Mediterranean seagrass infauna,

(1995) describes pectinate setae as having marginal teeth longer than inner in *M. conferta* and Gathof (1984) has illustrated it in this way for *M. sp. A*, but no information is given about the distributional patterns, so it is not absolutely clear if also the rest of C1 group species should remain under *Marphysa*.

The detailed re-examination and re-description of setal distribution for other *Marphysa* species is being recently encouraged (e.g. Hutchings & Karageorgopoulos, 2003; Hutchings *et al.* 2012). Both studies contributed, for example, to redefine and doubt the worldwide distribution of *M. sanguinea*. The Mediterranean records, in this study, stretch the geographical distribution of *M. adenensis* from Andaman Sea to Eastern Mediterranean (Fig. 10), but re-examination of other records may also lead to distribution redefinition. Moreover, if additional data (e.g. molecular) were available, distinction between Mediterranean material and specimens from the other ocean basins could be possible, as this was the case in studies that erected sibling species among morphologically identical populations and reduced the distribution of species formerly known as cosmopolitan (e.g. Knowlton 1993; Westheide & Schmidt 2003). When studying on species of Group C1 that are found so rarely, the basis of the conclusions are inevitably limited to phenotypic distinctions among few type-materials.

The relatively rare records of *M. adenensis* in a global scale, combined with the fact that the Mediterranean habitats were *P. oceanica* shoots (a micro-habitat which is much less investigated in the Eastern Mediterranean) make it probable to be a native, but overlooked species. In addition, the *P. oceanica* habitats that it has been found the past 4 years are very distant to each other. On the other hand, the Indo-pacific specimens were collected from a range of habitats that includes intertidal muddy substrata, which has been studied thoroughly in Eastern Mediterranean. Therefore, a recent introduction from the Indo-Pacific could also be speculated. Since clear evidence is absent, *M. adenensis* is reported as a cryptogenic species in the Mediterranean Sea at this stage.

The presence of *M. adenensis* in the Mediterranean Sea raises the number of *Marphysa* species of the area up to six. An updated artificial (**not phylogenetic**) key for the Mediterranean *Marphysa* spp. is provided:

1. Acicular setae bidentate. Composite falcigers only present or composite falcigers with composite spinigers present in anterior segments 2
- Acicular setae unidentate. Composite spinigers only present or composite spinigers with rare composite falcigers in far posterior segments 4
2. Composite spinigers and composite falcigers present 3
- Composite falcigers only present. Blade-length gradation up to more than twice as long in anterior segments. 1–2 pectinate setae of 4–8 teeth, present throughout. Acicular setae with vertical angle between teeth *M. adenensis*
3. Branchiae pectinate *M. bellii*
- Branchiae with 1–2 filaments *M. fallax*
4. Branchiae confined only in the anterior part of the body 5
- Branchiae distributed up to the posterior segments *M. sanguinea*
5. Composite spinigers only present. Acicular setae without terminal hood *M. kinbergi*
- Composite spinigers and rare composite falcigers in far posterior segments present. Acicular setae with terminal hood. *M. cinari*

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