ISSN: 0001-5113 AADRAY	ACTA ADRIAT. 38 (1): 65-70, 1997	UDC: 593.6 (262) Original scientific paper

Commented list of the Mediterranean Actiniaria and Corallimorpharia (Anthozoa)

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Biogeographical interpretation of the sea anemone fauna of the Mediterranean Sea still biased by taxonomical problems and shortage of data. On the basis of a literature review 51 species of Actiniaria and Corallimorpharia are listed here. Three species do not fulfill criteria for validity (ICZN), Heliactis minor *ANDRES, 1880,* Halcampella endromitata *ANDRES, 1883 and* Paraphellia sanzoi *CALABRESI, 1926. Of the remaining 48 valid species, 2 species are not properly documented for the Mediterranean Sea; their occurrence needs to be confirmed (*Edwardsiella carnea *and* Gonactinia prolifera*). An analysis of the intra-Mediterranean distribution data suggests that these are two major species groups. The first group comprises the fauna of the western Mediterranean and the Adriatic (dissimilarity of 40%), the second of the central and eastern Mediterranean, the Aegean and the Black Sea (dissimilarity of 55 to 80%). These results should be considered as an mistantaneous picture, liable to change with increasing research efforts in the presently less explored eastern areas of the Mediterranean.*

INTRODUCTION

In recent years biodiversity has had increasing attention, worldwide. For the sea anemone fauna of the Mediterranean sea the monographs, are the basic reference works ANDRES (1883/1884). CARLGREN (1949), PAX and MÜLLER (1962) and SCHMIDT (1972). Resent additions are DOUMENC *et al.* (1985), ATES (1990, 1992), CHINTIROGLOU (1992), DEN HARTOG *et al.* (1993), DEN HARTOG (1995), CHINTIROGLOU and DEN HARTOG (1995), and CHINTIROGLOU and STEPHANIDOU (1996). Given the new taxonomical information and new records now available for certain areas, this paper intends to update the view of intra - Mediterranean distribution.

MATERIAL AND METHODS

The data compiled from literature are presented in Table 1 and analysed by the method of multiple criteria grouping using the statistical software program S.P.S.S. The designation of the biogeographical areas of the Mediterranean follows PERES and PICARD (1964), FREDJ (1974) and ŠTEVČIĆ and GALIL (1994). On this basis, a cluster analysis was performed for each species and a distance matrix (presence - absence) was constructed. This database enclosed calculation of distance and dissimilarity tables. The Euclidean distance was used as the dissimilarity index and for the grouping of the biogeographical areas according to WARD's method.

RESULTS AND DISCUSSION

Among the 51 species of Table 1, three species described and published before 1931, do not fulfill criteria for validity (ICZN), *Heliactis minor* ANDRES, 1880, *Halcampella endromitata,* ANDRES 1883 and *Paraphellia sanzoi* CALABRESI, 1926. The original descriptions are without any illustration and do not permit subsequent recognition of the species. As such, these species must be considered as *nominum dubium* (DEN HARTOG, pers. comm.). Although *Edwardsiella carnea* (GOSSE, 1856) and *Gonactinia prolifera* (SARS, 1835) have been reported from the western Mediterranean (PAX, 1936; MANUEL, 1981), no precise data appear to exist for this area; these records may be based on misidentifications. Another undocumented record, listed by CHINTIROGLOU (1992) as new to the Greek fauna, namely *Paranemonia cinerea* (CONTARINI, 1844), also proved to be a misidentification (corrected by CHINTIROGLOU and DEN HARTOG,1995). Recently this species has been found in Lesvos island (DEN HARTOG pers. comm.). Based on the above mentioned facts, the total number of sea anemones in the Mediterranean, amounts to 46 species, two of wich belong to Corallimorpharia and 44 ones to Actiniaria.

The sea anemone fauna of the Mediterranean is still incompletely known (number of species, regional distribution) and deserves further research. According to SCHMIDT (1972), can be recognised three groups. The first group comprises species belonging to genera otherwise restricted to the North Atlantic. The second group includes species of subtropical to tropical affinities. The third group comprises species of the Morocco - Lusitanian regions. Of the 49 valid species of the Mediterranean, 43 are found in the western basin, 16 in the central area, 35 in the Adriatic, 22 in the eastern part, 23 in the Aegean Sea and 6 in the Black Sea. There appear to be nine endemic species in the Mediterranean, the origin of which is uncertain: *Bunodeopsisstrumosa, Condylactis aurantiaca, Cribrinopsis crassa, Paractinia striata, Paranemonia cinerea, P.vouliagmeniensis, Paranthus rugosus, Phymanthus pulcher* and *Sagartiogeton entellae.*

The multiple criteria grouping analysis suggests that the Actinaria and Corallimorpharia of the Mediterranean Sea fall into two distinct faunal groups (Fig. 1), the first group

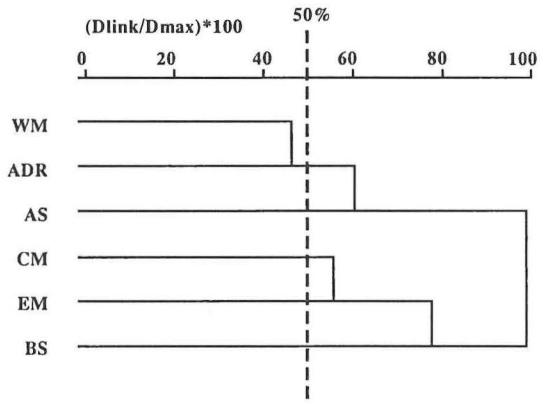

Fig.1. Biogeographic dissimilarity (based on presence/absence) of the Actiniarian fauna of the Mediterranean Sea: Western Mediterranean (WM), Central Mediterranean (CM), Adriatic Sea (ADR), Eastern Mediterranean (EM), Aegean Sea (AS), Black Sea (BS)

Table 1. Distribution of the Actiniarian fauna within the Mediterranean Sea. Western Mediterranean (WM), Central Mediterranean (CM), Adriatic Sea (ADR), Eastern Mediterranean (EM), Aegean Sea (AS), Black Sea (BS). (*) Nomina dubia

SPECIES	GEOGRAPHICAL DISTRIBUTION
Actinauge richardi (MARION, 1882)	**WM, C.M, ADR, EM, AS**
Actinia cari DELLE CHIAJE, 1841	**WM, CM, ADR, A.S**
Actinia equina LINNAEUS, 1758	**WM, CM, ADR, EM, AS, BS**
Actinia striata (RIZZI, 1907)	**WM, ADR, AS**
Adamsia carciniopados (OTTO, 1823)	**WM, CM, ADR, EM, AS**
Aiptasia diaphana (RAPP, 1829)	**WM, CM, EM**
Aiptasia mutabilis (GRAVENHORST, 1831)	**WM, CM, ADR, EM, AS**
Aiptasiogeton pellucidus (HOLLARD, 1848)	**W.M, EM, AS**
Alicia mirabilis JOHNSON, 1861	**WM**
Amphianthus dohrnii (KOCH, 1878)	**WM, CM, ADR**
Andresia parthenopea (ANDRES, 1884)	**WM, ADR, EM, AS**
Anemonactis mazelii (JOURDAN, 1880)	**WM, ADR**
Anemonia viridis (FORSKAL, 1775)	**WM, CM, ADR, EM, AS**
Anthopleura ballii (COCKS, 1850)	**WM, ADR**
Anthopleura rubripunctata (GRUBE, 1840)	**WM, ADR, EM**
Anthopleura thallia (GOSSE, 1854)	**WM**
Aureliana heterocera (THOMPSON, 1853)	**WM, ADR**
Bunodactis verrucosa (PENNANT, 1777)	**WM, ADR, EM, AS**
Bunodeopsis strumosa AANDRES, 1881	**WM, CM, ADR, EM, AS**
Calliactis parastica (COUCH, 1842)	**WM, CM, ADR, EM, AS**
Cereus pedunculatus (PENNANT, 1777)	**WM, C.M, ADR, EM, AS**
Condylactis aurantiaca (DELLE CHIAJE, 1825)	**WM, CM, ADR, EM, AS**
Corynactis viridis ALLMAN, 1846	**WM, CM, ADR, AS**
Cribrinopsis crassa (ANDRES, 1883)	**WM, ADR**
Edwardsia claparedi (PANCERI, 1869)	**WM, ADR, EM, AS, BS**
Edwardsiella carnea (GOSSE, 1856)	**WM**
Gonactinia prolifera (SARS, 1835)	**ADR**
Halcampella endromitata (ANDRES, 1880)*	**WM**
Halcampoides purpurea (STUDER, 1878)	**WM**
Haliplanella lineata (VERRILL, 1869)	**WM, ADR, BS**
Heliactis minor ANDRES, 1880*	**WM**
Hormathia alba (ANDRES, 1881)	**WM, CM**
Hormathia coronata (GOSSE, 1858)	**WM, CM, ADR, EM, AS**
Mesacmaea mitchellii (GOSSE, 1853)	**WM, ADR, EM, AS**
Paractinia striata (RISSO, 1826)	**WM**
Paranemonia cinerea (CONTARINI, 1844)	**WM, ADR, AS**
Paranemonia vouliagmeniensis DOUMENC *et al.*, 1987	**AS**
Paranthus rugosus ANDRES, 1881	**WM, ADR**
Paraphellia sanzoi CALABRESI, 1926*	**EM**
Peachia cylindrica (REID, 1848)	**WM, ADR, BS**
Phymanthus pulcher ANDRES, 1883	**WM, ADR, EM, AS**
Sagartia elegans (DALYELL, 1848)	**WM, ADR**
Sagartia troglodytes (PRICE, 1847)	**WM, ADR**
Sagartiogeton entellae SCHMIDT, 1972	**WM, ADR**
Sagartiogeton undatus (MÜLLER, 1788)	**WM, ADR, EM, AS, BS**
Scolanthus callimorphus (GOSSE, 1853)	**WM, ADR**
Sideractis glacialis DANIELSSEN, 1890	**WM**
Synhalcampella oustromovi WYRAGÉWITCH, 1905	**BS**
Telmatactis cricoides (DUCHASSAING, 1850)	**CM, EM**
Telmatactis forskalii (EHRENBERG, 1834)	**WM, CM, ADR, EM, AS**
Telmatactis solidago (DUCHASSAING & MICHELOTTI, 1864)	**EM, AS**

comprising the fauna of western Mediterranean and the Adriatic, with a dissimilarity index of ca. 40%; the second group comprising the fauna of the central and eastern parts of the Mediterranean and Black Sea, with a dissimilarity index ranging from 55 to 80%. This confirms that our knowledge of some Mediterranean areas is preliminary, as reflected by the large dissimilarity percentages of the second group.

Our results concerning the Actinaria are somewhat similar to those obtained by VAFIDIS *et al.* (1994) for the Octocorallia, KOUKOURAS *et al.* (1992) and ŠTEVČIĆ and GALIL (1994) for the Decapoda Crustacea, and by KOUKOURAS *et al.* (1995) for the Ascidians. Some areas of the Mediterranean are still poorly explored and available data are still far from being representative. Nevertheless, the similarity between the faunas of the Western Mediterranean, the Adriatic and the Aegean Seas will increase with an increasing research effort in the latter area.

ACKNOWLEDGEMENTS

The authors express their thanks to Dr. DEN HARTOG, J.C. for useful information and literature concerning the paper.

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Accepted: February 25, 1997.

Popis mediteranskih Actiniaria i Corallimorpharia (Anthoza) s tumačenjem

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Biogeografska interpretacija faune anemona u Sredozemlju je još manjkava s aspekta taksonomije i malog broja podataka. Na osnovu literaturnih pregleda prikazana je 51 vrsta aktinarija i koralimorfarija. Tri vrste ne zadovoljavaju kriterije (ICZN), *Heliactis minor* Andres, 1880, *Halcampella endromitata* Andres, 1883, i *Paraphellia sanzoi* Calabresi, 1926. Od ostalih 48 određenih vrsta, 2 vrste nisu dovoljno dokumentirane za Sredozemno more i njihova pojava treba biti potvrđena (*Edwardsiella carnea* i *Gonactinia prolifera*). Analiza raspodjele unutar Sredozemlja upućuje na dvije glavne grupe vrsta. Prva grupa obuhvaća faunu zapadnog Sredozemlja i Jadrana (raznovrsnost od 40%), a druga grupa srednje i istočno Sredozemlje, Egejsko i Crno more (raznovrsnost 80%). Ovi rezultati trebaju se razumjeti kao nedovršen prikaz, koji će se mijenjati s novim istraživanjima u do sada manje istraženom području istočnog Sredozemlja.