

First record of *Paradiopatra bihanica* (Polychaeta, Onuphidae) in the Adriatic Sea

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Paradiopatra bihanica (Intes & Le Loeff, 1975) (Polychaeta, Onuphidae) is reported for the first time in the Adriatic Sea. In this study the morphological characters of the observed individuals are provided, as well as the extension of its hitherto geographical distribution.

Key words: *Paradiopatra bihanica*, Polychaeta, Onuphidae, new record, Adriatic Sea

INTRODUCTION

Paradiopatra bihanica (Intes and Le Loeff, 1975) is a polychaete species belonging to the family Onuphidae. Members of this family occurs in all oceans from intertidal to the deepest depths (FAUCHALD & JUMARS, 1979; FAUCHALD, 1980; PAXTON, 1986; BUDAeva & ROGACHEVA, 2013), inhabiting various biotopes and occasionally reaching very high densities (BAILEY-BROCK, 1984). These species range in length from a few centimeters to 3 meters (PAXTON, 1986).

Most of them are tubicolous and can live permanently in rather sturdy tubes (deep-water species), in fragile (shallow water species) or in very fragile temporary tubes (sandy beaches species; PETTIBONE, 1963; PAXTON, 1979; FAUCHALD, 1980; PAXTON, 1986).

Up to now regarding the Italian Seas *P. bihanica* has been found only in the Tyrrhenian and in the Ionian Seas (CASTELLI *et al.*, 2008) with the synonym of *Paradiopatra calliopae* Arvanitidis & Koukouras 1997 (BUDAeva & FAUCHALD, 2011; PAXTON & BUDAeva, 2013; ÇINAR *et al.*, 2014.; PAXTON, 2015a).

This paper reports for the first time the occurrence of *P. bihanica* in the Adriatic Sea with the aim of increasing the range extension of its geographical distribution.

MATERIAL AND METHODS

The examined material was sampled in 2012 during a monitoring program carried out in two areas located 60-70 km offshore of Marche region (Central Adriatic Sea), at a depth ranging from 60 to 80 m (Fig. 1) and characterized by the presence of relict sands (sand: 80-85%, silt: 8-12%, clay: 5-8%).

These areas are particularly interesting from a hydrodynamic point of view, because they are not consistently affected by the general circulation of the basin directed northwards along the Croatian coasts and southwards along the Italian ones (ARTEGIANI *et al.*, 1997). However, sometimes they are subjected to a greater hydrodynamism caused by the winter cooling that occurs in the northern Adriatic Sea. This hydrodynamism causes a strong water densification resulting in the collapse of the water mass (MARINI *et al.*,



Fig. 1 Location of the two sampling areas

2008; CAMPANELLI *et al.*, 2011). These particularly cold and dense waters have different chemical and physical features and may cause changes of currents with possible modifications in the biogeochemical and spatial distribution of the sediments.

Samples of sediment were collected using a Van Veen grab (capacity: 12 L; width: 0.095 m²), sieved *in situ* through a 0.5 mm mesh and preserved in 4% buffered formalin. In the laboratory, the polychaetes taxa were examined under higher magnification using stereomicroscope and a binocular microscope, and identified according to FAUVEL (1923), DAY (1967), FAUCHALD (1982), GEORGE & HARTMANN-SCHRÖDER (1985), PAXTON (1986), ARVANITIDIS & KOULKOURAS (1997), BUDAIEVA & FAUCHALD (2011).

Small specimens and body parts (such as parapodia and jaws) were temporarily mounted in diluted glycerin and used for the detailed examination of chaetae and dentition of maxillae. Successively they were photographed using ZEISS AxioCam ERc 5s camera mounted on binocular microscope and measured using ImageJ software. The width of specimens was measured at the level of the tenth chaetiger (excluding chaetae and parapodia), while length was measured from the anterior margin of prostomium to the end.

RESULTS AND DISCUSSION

In total 52 specimens of *P. bihanica* were collected. All of them were incomplete speci-

mens, varying from 5.15 mm (16 chaetigers) to 16.48 mm (40 chaetigers) in length and 0.37-0.46 mm width. They are characterized by a pair of eyespots and prostomial appendages consisting of five dorsal antennae, a pair of frontal palps and a pair of labial ones (Fig. 2a). Peristomium bears a pair of cirri located near its anterior edge. Ceratophores are cylindrical, with five rings (Fig. 2b).

The median antenna (that reaches chaetiger 4) is shorter than the lateral ones (that reach chaetiger 6-9).

The first 3 setigers have digitiform ventral cirri and bidentate or tridentate pseudo-compound triangular hooded hooks having evenly convergent margins and sharply pointed tips (BUDAIEVA & FAUCHALD, 2011; Fig. 2c).

Our specimens bring 1-2 long and very finely limbate capillary setae on the upper bundle of the first 3 setigers only, while a pair of thick subacicular hooks occurs from the 9th setiger to the last one (Fig. 2d). Postchaetal lobes are well developed on first 8 chaetigers, thereafter becoming small projections. Moreover, 1-3 small, very thin, pectinate setae each bearing 12-15 teeth in the upper bundle are present from the 16th to the last setiger. Branchiae start from setiger 11-12 and consist of two filaments (Fig. 2e). Maxillary formula: Mx I = 1+1, Mx II = 9+9, Mx III = 8+0; Mx IV = 9+8, Mx V = 1+1 (Fig. 2f-g).

Tubes are constructed with soft *parchment* like lining and thick outer layer of mud or fine sand particles. These particles may be attached at right angles, similar to *Diopatra* tubes (PAXTON, 1986).

Probably, accordingly with other tube-building polychaetes, the worms remain in the tubes except during feeding when anterior region protrudes from the tube mouth to forage in the surroundings (BAILEY-BROCK, 1984).

Regarding its geographical distribution, both the World Register of Marine Species (WoRMS) and the European Register of Marine Species (ERMS) report *P. bihanica* in the European waters from Atlantic Ocean to Mediterranean Sea (PAXTON, 2015a, b). In particular, MARTINEZ & ADAR-RAGA (2001) and MARTINEZ *et al.* (2005) found

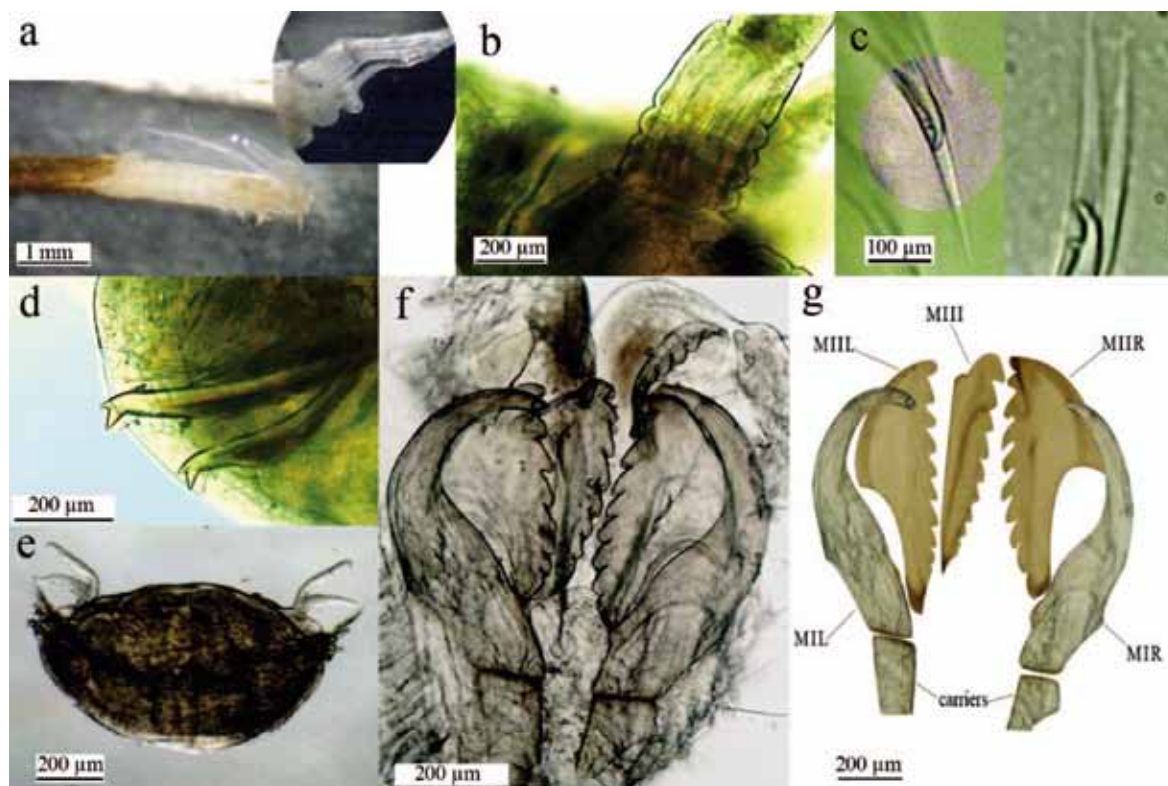


Fig. 2 *Paradiopatra bihanica* (Intes & Le Loeuff, 1975): a: Anterior part with the detail of prostomium; b: Ceratophores; c: Bidentate and tridentate pseudo-compound triangular hooded hooks; d: Ninth setiger with the detail of subacicular hooks; e: Section of the eleventh setiger with branchiae; f-g: Maxillae

this polychaete on muddy sand bottom during a monitoring carried out in the Guipúzcoa continental platform (Gulf of Biscay). Specimens were also collected from the Tyrrhenian, Ionian and Aegean Seas from various types of sediment (ARVANITIDIS & KOUKOURAS, 1997; SIMBOURA & NICOLAIDOU, 2001; CASTELLI *et al.*, 2008). Finally, *P. bihanica* has been reported by different authors (ÇINAR, 2005; MUTLU *et al.* 2010; ÇINAR *et al.* 2014) in Marmara Sea and Levantine Sea from 100 to 200 m depth.

The knowledge about its feeding behavior and its ecology is very poor. The only available literature reports the genus *Paradiopatra* as motile omnivore scavenger (TSELEPIDES *et al.*, 2000) by copying older information available for onuphids (FAUCHALD & JUMARS, 1979). In AMBI software species list (AMBI version 5.0, with the species list version of March 2012; [\[azti.es/ambi/\]\(http://ambi.azti.es/ambi/\)\) this Polychaeta is described as a species belonging to group I, that includes very sensitive species to organic enrichment and occurring under unpolluted conditions \(BORJA *et al.*, 2000\). This classification agrees with that performed by SIMBOURA & ZENETOS \(2002\) and the BENTIX software species list \(<http://www.hcmr.gr/en/articlepage.php?id=141>\) that consider *P. bihanica* a species sensitive to disturbance in general.](http://ambi.</p>
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Prvi nalaz vrste *Paradiopatra bihanica* (Polychaeta, Onuphidae) u Jadranskom moru

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SAŽETAK

Paradiopatra bihanica (Intes & Le Loeuff, 1975) (Polychaeta, Onuphidae) je po prvi put pronađena u Jadranskom moru. U ovom radu su prikazane morfološke karakteristike istraživanih jedinki, te su priloženi podaci o njezinoj geografskoj raspodjeli.

Ključne riječi: *Paradiopatra bihanica*, Polychaeta, Onuphidae, prvi nalaz, Jadransko more