First record of the genus Arhynchite (Echiura) in the Mediterranean Sea

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FIRST RECORD OF THE GENUS *ARHYNCHITE* (ECHIURA) IN THE MEDITERRANEAN SEA

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Arhynchite arhynchite
ECHIURA
FIRST RECORD
MEDITERRANEAN
RHÔNE PRODELTA

ABSTRACT. – The echiuran genus *Arhynchite* Satô, 1937 with the species *Arhynchite arhynchite* (Ikeda, 1924) is recorded for the first time in the Mediterranean Sea. Five specimens were found in the muddy bottoms of the Rhône prodelta (Gulf of Lions, France). They are described and compared with published descriptions of *A. arhynchite*.

INTRODUCTION

The genus *Arhynchite* is worldwide represented by seven species (Murina 2010), six of which, namely *A. arhynchite* (Ikeda 1924), *A. californicus* Fisher, 1949, *A. hiscocki* Edmonds, 1960, *A. inamoenus* Fisher, 1946, *A. pugettensis* Fisher, 1949, and *A. rugosus* Chen & Yeh, 1958, occur mainly at both margins of the Pacific Ocean (Stephen & Edmonds 1972, Zhou *et al*. 2007). One species named *A. paulensis* Amor, 1971 was described from Brazil, in the southern Atlantic Ocean (Amor 1971).

A complete review of the Echiura of the Mediterranean Sea was published by Murina (1984). She compiled a list of six species assigned to five genera, but no representatives of *Arhynchite* species were included. A further echiuran species, *Ochetostoma erythrogrammon* Leuckart & Rüppell, 1828, was recently added to the Mediterranean fauna (Saiz & Ruthensteiner 2005).

The specimens reported here were obtained mainly during the CHACCRA project to investigate the influence of the plume of the Rhône River on the soft-bottom macrozoobenthic communities in the Rhône prodelta (France). The sampling sites were located off the French shore of the Mediterranean Sea, close to the mouth of the

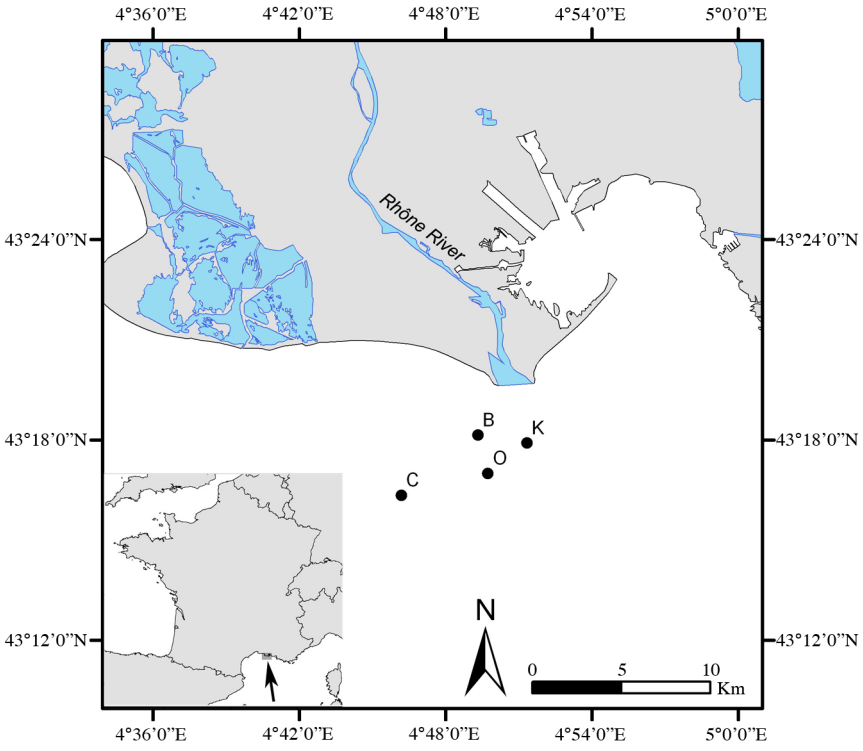

Fig. 1. – Sampling sites (B, C, K, O) where *Arhynchite arhynchite* (Ikeda, 1924) was collected in the Rhône prodelta, Gulf of Lions (France). The inset shows the overall location of the Rhône prodelta.

Rhône River, at a depth of 54-79 m (Fig. 1), where the substratum was pure soft mud. At the sampling time the salinity was between 37.8 to 38.3, and the temperature ranged from 14.5 to 16.8 °C close to the bottom. Species identification mainly followed the monograph of Stephen & Edmonds (1972) and Fisher (1946, 1949) detailed contributions on the genus *Arhynchite*. Specimens collected were preserved in 70 % ethanol and deposited in the collection of the 'Laboratoire Arago', at Banyuls-sur-Mer (France) (JM Amouroux coll).

The aim of the present study is to document the species identity by a morphological characterization and to report this new finding for the Mediterranean Sea.

Arhynchite arhynchite (IKEDA, 1924)

Figs. 2, 3

Material examined:

- Cruise 'Tethys'; Stat. 0; 43º 16.997' N-4º 49.736'E; depth: 79 m; Rhône prodelta; Gulf of Lion, France; date: 2001; specimen # 1.

- Cruise 'Chaccra'; Stat. K4; 43º 17.911' N-4º 51.348' E, depth: 62 m; Rhône prodelta; Gulf of Lions, France; date: 28-05-2008; specimens # 2, # 3.

- Cruise 'Chaccra'; Stat. C; 43º 16.440' N-4º 46.524' E, depth 75 m; Rhône prodelta; Gulf of Lion, France; date: 04-2007; specimen # 4.

- Cruise 'Chaccra'; Stat. B; 43º 18.144' N-4º 49.355' E, depth: 54 m; Rhône prodelta; Gulf of Lions, France; date: 20-04-2007; specimen # 5.

DESCRIPTION

The five specimens studied were subcylindrical to sausage shaped (Fig. 2A), pinkish to violet in colour as preserved in ethanol (grey in living condition) with prominent verrucose papillae all over the trunk. By contrast, specimen #4 showed a smooth skin in some areas of the middle of the trunk (Fig. 2B). The body wall was thick and opaque. Both ends of the trunk were similar, rounded and with larger and denser verrucose papillae (Fig. 2C-D). The length of the trunk was 115-135 mm and the width 15-28 mm. The proboscis (detached in specimens # 2, # 3, and completely lost in the remaining specimens) was deciduous. Its shape was spoon-like, rounded distally, 35-40 mm long, and 4-8 mm wide (Fig. 3A). Its color was mostly cream, with brown pigment in one side and cross furrows at the expanded distal end. Two dark brown small setae were retracted and placed just behind the mouth (Fig. 3B). The genital pores were not visible externally. Internally, the longitudinal musculature was continuous. The two setal sacs were connected by a long slender interbasal muscle. The vascular system showed a blood-ring vessel (Fig. 3C) in specimen # 1. The neurointestinal vessel formed also a loop around the interbasal muscle. The gut was extremely long, thin walled and convoluted, fixed to the bodywall by many fixing muscles. The postsetal gonoducts full of sperm (in specimens # 1, # 5) are arranged in one pair, (except specimen # 1 which showed one extra smaller presetal gonoduct on right side). The length of postsetal gonoducts was about 25-50 mm. The gonostomes were large with a leaf-like appearance (Fig. 3D). The gonostomal lips were irregular with a lobed margin. The rectal caecum was absent. The anal vesicles were two thin unbranched tubes (Fig. 3E), 35 mm long, brown in color. They were attached to the body wall by few mesenteries and over its surface minute funnels were discernible in specimen # 1, since vesicles were relatively relaxed.

DISCUSSION

The name *Arhynchite* [Greek, *a*: not; *rugkion*: small snout] was firstly introduced by Ikeda (1924) as a specific epithet for *Thalassema arhynchite*, since all specimens collected showed no trace of probosces. When the genus *Arhynchite* was established (Satô 1937), it was characterized by the apparent absence of a proboscis. However, Fisher (1949) found some specimens of *Arhynchite* with proboscis. He re-validated the genus by including in its diagnosis the deciduous character of the proboscis and the large leaf-like gonostomes. As observed also in our collection (from 5 specimens, only 2 detached proboscis collected), members of this genus exhibit a tendency for self-amputation (autotomy) of the proboscis when captured. This suggests an adaptation to escape from predators, offering a part of the body, which is likely easily regenerated (Dawydoff 1959). Concerning the generic name *Arhynchite*, there is another related genus *Paraarhynchite* proposed by Chen (1963), and overlooked in the Stephen & Edmonds (1972) monograph. The last genus is well separated from *Arhynchite* by the presence of longitudinal bands along the internal musculature of the body wall (Zhou *et al*. 2007).

The genus *Arhynchite* Satô, 1937 is classified within the subfamily Thalassematinae Monro, 1927, together with the genus *Thalassema* Lamarck, 1801, whose species *Thalassema thalassemum* (Pallas, 1766), and *Thalassema papillosum* (Delle Chiaje, 1841) were found in the Mediterranean Sea (Jameson 1899, Murina 1984). *Arhynchite arhynchite* (Ikeda, 1924) is easily separated from any species of *Thalassema* by the presence of large gonostomes expanded into a leaf-like structure (Stephen & Edmonds 1972).

According to the monograph of the phylum Echiura by Stephen & Edmonds (1972), some species of the genus *Arhynchite* are very closely related and difficult to distinguish. Nevertheless, they were able to build an identification key of all species. Two characters are

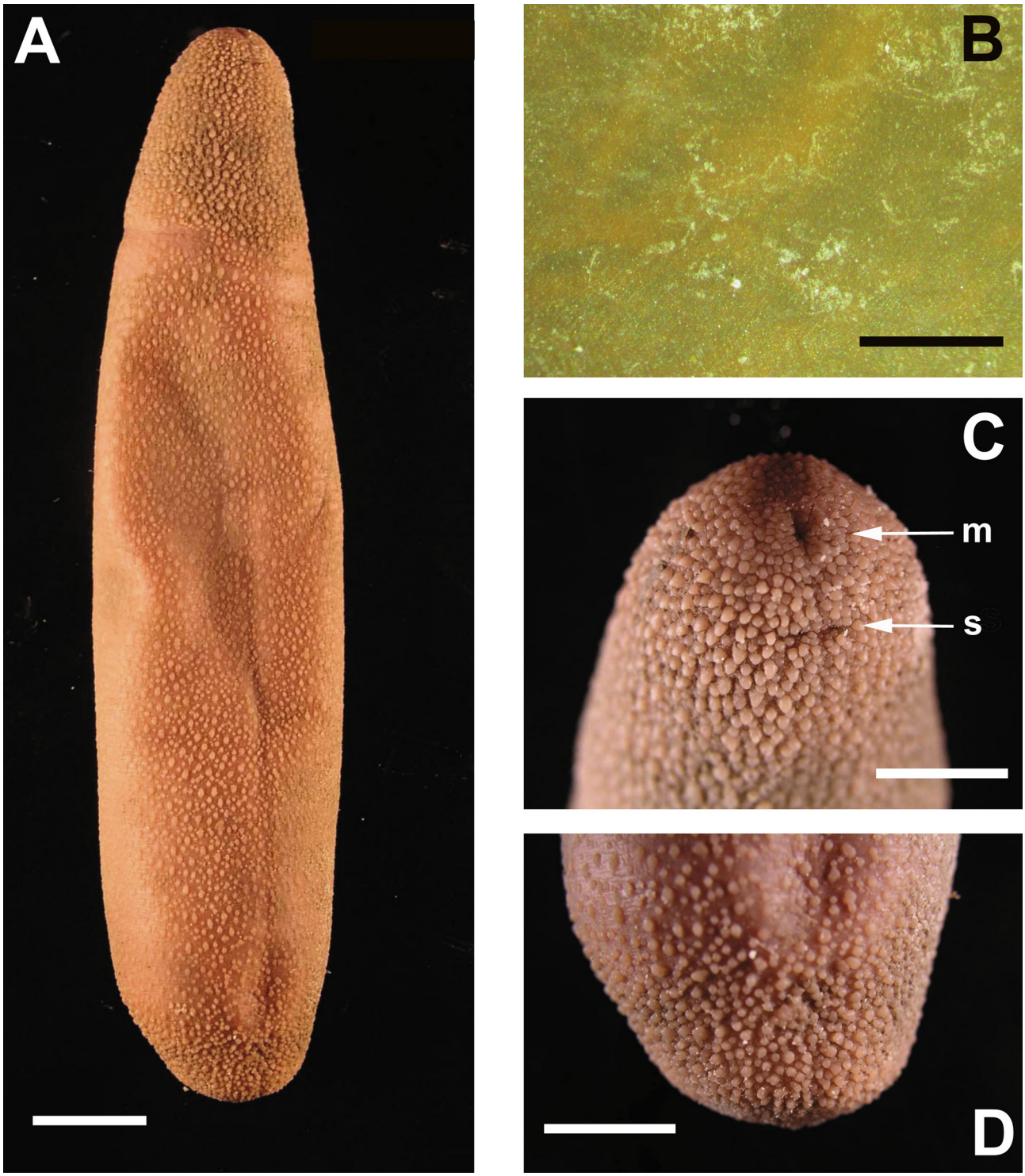

Fig. 2. – *Arhynchite arhynchite* (Ikeda, 1924) from Rhône prodelta, Gulf of Lions (France). A, A general view of specimen # 1. Scale bar = 20 mm. B, Specimen # 4, smooth skin from middle part of the trunk. Scale bar = 2 mm. C, Specimen # 1, detail of anterior end of the trunk. Arrows indicate mouth and a seta opening respectively. Scale bar = 8 mm. D, Specimen # 1, detail of posterior end of the trunk. Scale bar = 10 mm. Abbreviations: m = mouth; s = seta opening.

important for the identification of *Arhynchite arhynchite*, namely (i) the presence/absence of a ring-blood-vessel at the posterior region of foregut and (ii) the shape of the gonostome lip.

A ring-blood-vessel has been observed in specimen # 1 (Fig. 3C). However, many attempts to observe the character in other collected specimens were unfruitful, since the internal preservation was in general quite poor.

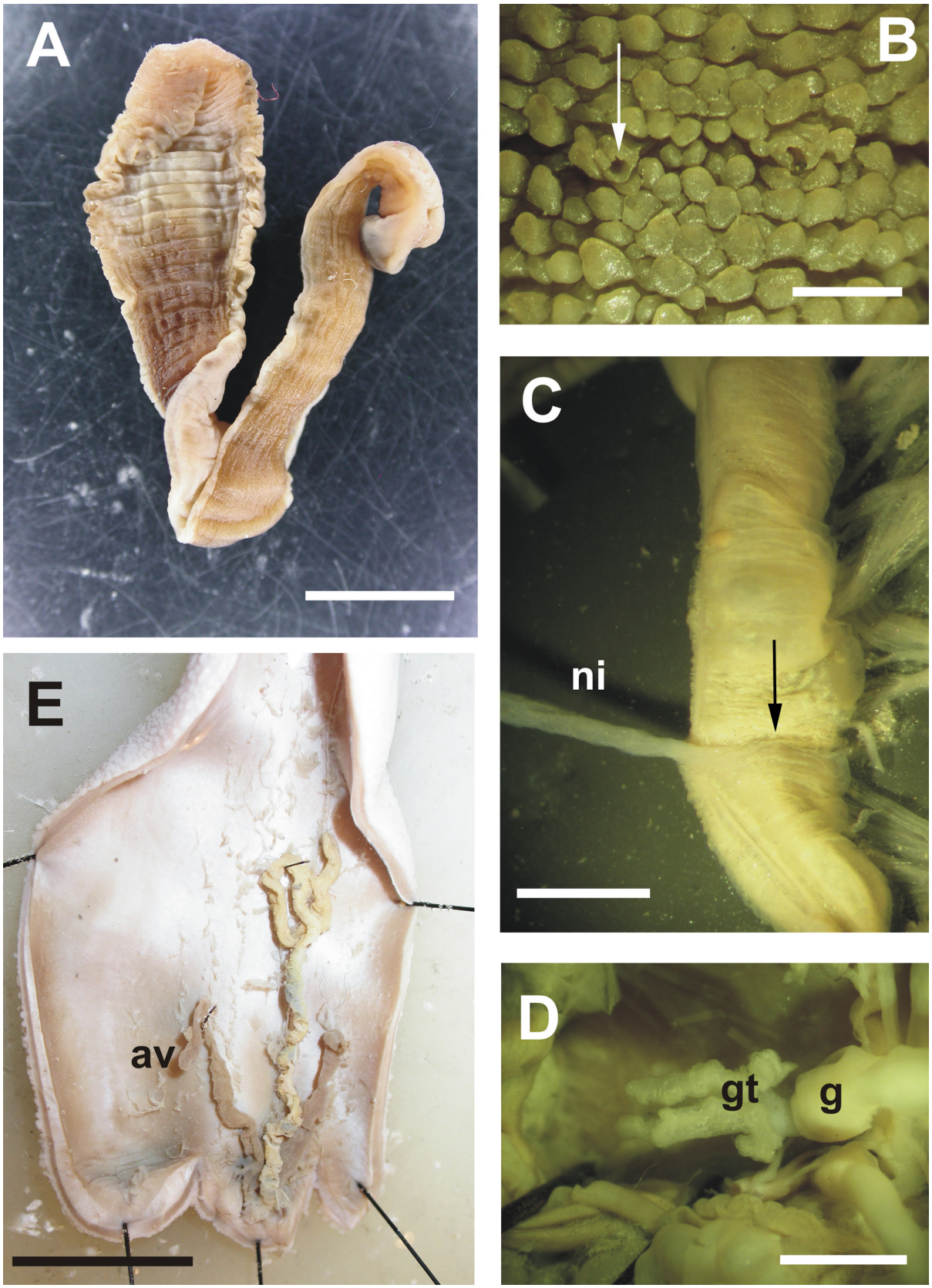

Fig. 3. – *Arhynchite arhynchite* (Ikeda, 1924) from Rhône prodelta, Gulf of Lion (France). A, Specimen # 3, proboscis detached from specimen. Scale bar = 5 mm. B, Specimen # 3, retracted setae on the anterior part of the trunk. Arrow indicates a seta opening. Scale bar = 1 mm. C, Specimen # 1, blood-ring-vessel indicated by an arrow. Scale bar = 1.5 mm. D, Specimen # 1, leaf-like gonostome. Scale bar = 30 mm. E, Specimen # 2, anal vesicles and cloaca. Scale bar = 15 mm. Abbreviations: av = anal vessicle; g = gonoduct; gt = gonostome; ni = neurointestinal vessel.

This feature was suggested by Fisher (1946) as meriting a generic rank in the classification of Echiura. However, the Japanese descriptions of the species by Ikeda (1924) and Satô (1937) do not mention this character, although in the respective drawings of the species it seems to be represented. In fact, Stephen & Edmonds (1972) indicated in their key to species the presence of a ring-blood-vessel at the posterior part of the foregut. Concerning the second character, gonostomal lips are much expanded and match well the original drawing of the Japanese specimens by Ikeda (1924). However, the Mediterranean specimens show an external difference to the Japanese ones. They exhibit more verrucose papillae all over the trunk, whereas the Japanese ones are 'almost smooth to the unaided eye' along the middle areas of the trunk (Ikeda 1924, Satô 1937). We have not used this character for distinction, since our specimens are mostly verrucose, except for specimen # 4 which exhibits smooth areas in the middle part of the trunk (Fig. 2B). It seems there is some variability depending on the contraction/relaxation state of the captured specimens.

The record of the genus *Arhynchite* in the Mediterranean is remarkable for several reasons. First of all, the genus showed mainly a coastal Pacific distribution (Japan, China and USA), except for two isolated records, one in Mozambique basin, Indian Ocean (DattaGupta 1983) and other in Brazil, South Atlantic Ocean (Amor 1971). Neither the 'Faune de France' (Cuénot 1922), nor the Mediterranean review of echiurans by Murina (1984) included this genus. The finding poses now a pertinent question: have large benthic invertebrates (such as the present echiuran) been overlooked by taxonomists even in well studied areas like the coastal zone of the Mediterranean Sea; or does this new record represents an introduced alien species? It is difficult to assess this point at present because of the scarce data available.

In conclusion, the geographical distribution of *Arhynchite arhynchite* (Ikeda, 1924) has been enlarged considerably to the Mediterranean Sea. Previously, the species was mainly restricted to several coastal localities in Japan (Ikeda 1924, Satô 1937, Nishikawa 2001), except for one isolated abyssal record in the Mozambique basin, Indian Ocean (DattaGupta 1983).

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