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First record of the genus *Dermatobranchus* van Hasselt, 1824, in the Mediterranean Sea (Nudibranchia: Arminidae)

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Abstract

Three individuals of a nudibranch belonging to the genus *Dermatobranchus* (Arminidae) were found at a depth of 3 meters, in a bottom with sand and gravel, during night SCUBA diving activity in Porto Pirrone, Leporano, Taranto, Apulia, Italy. The external morphology and coloration of these Mediterranean individuals clearly resemble those of *D. rubidus* (Gould, 1852), a species known only from the central and western Pacific Ocean. This is the first record of the genus *Dermatobranchus* van Hasselt, 1824 for the Mediterranean Sea.

Keywords: *Dermatobranchus* cf. *rubidus*, Arminidae, Mediterranean Sea, Italy.

Introduction

The genus *Dermatobranchus* van Hasselt, 1824 [family Arminidae Iredale & O'Donoghue, 1923 (1841)] is characterized by the absence of subnotal lamellae and the extension of the digestive gland into the foot (Kolb & Wägele, 1998). It also has separated rhinophores, a character shared with the genus *Histiomena* Mörch, 1860, while most of the species ranked in *Armina* Rafinesque, 1814 show rhinophores placed close together (Báez et al., 2011). Thompson et al. (1990) elevated the genus *Dermatobranchus* to family rank (Dermatobranchidae) because of the absence of hyponotal lamellae; but currently *Dermatobranchus* is considered to belong to the family Arminidae, and the family Dermatobranchidae is thus a synonym of Arminidae (Kolb & Wägele, 1998; Bouchet & Rocroi, 2005; Gosliner & Fahey, 2011).

The genus *Dermatobranchus*, hitherto never collected from the Mediterranean Sea, is represented by approximately 40 species distributed in the Indo-Pacific, South Africa and the Red Sea (Kolb & Wägele, 1998; Gosliner & Fahey, 2011; Yonow, 2008); it is not present in the Atlantic.

In October 2014, three individuals of a nudibranch whose external morphology matches the description of *Dermatobranchus rubidus* (Gould, 1852) as redescribed by Gosliner & Fahey (2011) were found in the locality Porto Pirrone, Ionian Sea. *Dermatobranchus rubidus* is widely distributed in the Western and Central Pacific: it

is known from New Zealand, South Australia, the Philippine Islands, Japan and Hawaii (Gosliner & Fahey, 2011). With this note we report the first record of the genus *Dermatobranchus* for the Mediterranean Sea.

Materials and Methods

Three individuals were found during night SCUBA diving activity at 23:15 local time on 31 October 2014 at 3 meters depth, in Porto Pirrone, Leporano, Taranto, Apulia, Italy, in the Ionian Sea; the geographical coordinates of the site are 40.371365° N, 17.308702° E (Fig. 1). The nudibranchs were found on a sandy bottom, twisted together, probably in reproductive activity. As a response to the disturbance of the light by the photographers, they quickly tried to hide back under the sand, leaving clear traces of mucus agglutinated with sand. Photographs were taken with a Nikon D700 camera, 60 mm Micro Nikkor lens and strobes. Animals were not collected.

Description of the material

The individuals observed were broad and flattened in shape, tapering at the posterior end; the foot was a little wider than the mantle and had the anterior end with two lateral corners projected toward the posterior. The oral veil with frilly margin extended laterally into two thin, elongate and sharp corners. The notum had a series of longitudinal ridges: a median one starting just behind the



Fig. 1: Map of the area where the individuals were found.

rhinophores and going up to the posterior end of notum and at each side of it there were five other ridges. In the middle third of the body thinner ridges appeared, interleaved with the larger ones, so that in the central part of the back the total number of ridges was ten or eleven on each side. Rhinophores were close to one another, but well separated; they had a rounded tip with a series of thin longitudinal lamellae. The eyes were placed at the outer base of the rhinophores. The ground colour of different individuals showed lines from white to light yellow and the notum from burnt sienna to reddish brown, darker on the central part of the body. The mantle and the foot had a well-defined light margin and the rhinophores were light red. The sizes of the three individuals ranged from 40 to 80 mm (Figs. 2-4).

Discussion

The external morphology of the Mediterranean individuals perfectly matches the original description of *Dermatobranchus pulcherrimus* Miller & Willan, 1986 from New Zealand and South Australia, even in colour and in number and structure of the dorsal ridges. The description of *Dermatobranchus rubidus* coincides also, with the exception of the colour and the number of dorsal ridges; indeed Gosliner & Fahey (2011) described their interpretation of *D. rubidus* with a larger median longitudinal ridge and only five thinner ridges on each side, a translucent red dorsum and white opaque dorsal ridges. In the original description Gould (1852) did not specify the number of ridges but only said “numerous” and defined the colour of the back as pale red. Since *D. pulcherrimus* has been deemed a synonym of *D. rubidus* following Gosliner & Fahey (2011), these differences in

colour and number of ridges are consistent within the intraspecific variability. We have therefore identified our individuals as *D. cf. rubidus* (Gould, 1852).

The finding and, therefore, the presence of a *Dermatobranchus* of likely Pacific origin in the Ionian Sea cannot be ascribed to a natural and autonomous territorial expansion of the species, given the absence of recorded populations in the Indian and Atlantic Oceans. We strongly support the hypothesis of an anthropogenic ingress, most probably through involuntary means such as ballast waters or aquaculture. In fact, Taranto’s commercial harbour and the surrounding areas are considered one of the main hotspots of alien species introduction in the Mediterranean, as a result of port activity and aquaculture (Gravili *et al.*, 2010; Occhipinti-Ambrogi *et al.*, 2011; Zenetos *et al.*, 2012). However, the information about the life cycles of species of *Dermatobranchus* is very poor and conflicting. Data on only two species are available. The first is *D. striatellus* Baba, 1949 that has non-pelagic lecithotrophic larvae (Todd, 1981), that would not be able to survive a long transportation. By contrast an undescribed species of the genus *Dermatobranchus* from Eastern Australia has a long pelagic period (approximately five weeks) as a veliger larva (Furuhashi *et al.*, 2006). This type of development would be more consistent with the hypothesis of an anthropogenic transport.

The only alternative possibility is that the Mediterranean animals belong to a not yet described species morphologically very similar with *D. rubidus*. Anatomical and molecular studies could solve this uncertainty, but unfortunately the individuals were not collected, and until now further research in the same locality did not disclose more animals.



Fig. 2: *Dermatobranchus* cf. *rubidus* (Gould, 1852), Porto Pirrone, Italy, 31 October 2014, extended while crawling (photo by Roberto Strafella).



Fig. 3: *Dermatobranchus* cf. *rubidus* (Gould, 1852), Porto Pirrone, Italy, 31 October 2014, 3 individuals tangled together at finding, possibly for mating. (photo by Giovanni Colucci)



Fig. 4: *Dermatobranchus* cf. *rubidus* (Gould, 1852), Porto Pirrone, Italy, 31 October 2014, burrowing in sand soon after taking the flash photo of Fig. 3. (photo by Giovanni Colucci).

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