

Rhizostoma luteum, or *Rhizostoma pulmo*, that is the question

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ABSTRACT

In this present study, we report historical and recent records of living and stranded specimens of *Rhizostoma luteum*, which was first described in 1827 by Quoy & Gaimard under the name *Orythia lutea* from the Strait of Gibraltar (Southern Iberian Peninsula). We reviewed historical records and report sightings from the Northeastern Atlantic and Alboran Sea of photographic materials taken by citizens of *R. luteum* since 1998. After 60 years of no scientific records of this species, in 2013 a phylogenetic analysis ratified that *R. luteum* differed from *Rhizostoma pulmo* and *Rhizostoma octopus*. Our study confirms, that in the past, *R. luteum* was frequently misidentified in the Alboran Sea with the closely related Mediterranean *R. pulmo* and, likewise, in the Northeastern Atlantic with another jellyfish from the order Rhizostomeae, *Catostylus tagi*. These results indicate that at least in the last decade the abundance of *R. luteum* was more significant than *R. pulmo* in the West and South coasts of the Iberian Peninsula and West and North shores of Africa, as we were able to confirm more than 150 observations of *R. luteum* in the past 17 years and only a hand full of *R. pulmo*.

INTRODUCTION

Representative of the group of scyphozoa, containing almost 200 species [1] are found in all oceans and occur in pelagic habitats from the surface to the abyss. The genus *Rhizostoma* has been a subject of much controversy in the past and at present, three species of the genus *Rhizostoma* are recognized: *R. pulmo* (Macri, 1778), *R. octopus* (Linnaeus, 1788) and *R. luteum* (Quoy & Gaimard, 1827). *R. pulmo* is occurring in the Mediterranean and the nearby Atlantic Ocean coastal regions, while *R. octopus* is established in Northwest Europe, appearing along the Southern and Western coasts of the British Isles and in the Southern North Sea. *R. luteum* is found off the coasts of Portugal, the Strait of Gibraltar, and the West coast of Africa.

Until this study, there has been a lot of debate about *R. luteum*, which was always referred as rare species and only on 8 occasions, samples of this giant jellyfish have been collected since 1827 [2,3,4]. After 60 years of no scientific records, in 2013 Prieto *et al.* [4] presented reports of sightings of living and beached specimens on the Atlantic coast of Morocco and along the south shore of the Iberian Peninsula during Summer 2012 and Winter 2013 from the Gulf of Cádiz. This was the first account of this species in the Southwestern Mediterranean Sea, describing also the genetic signature and confirmation of the different species.

MATERIALS AND METHODS

We reviewed historical references since Quoy & Gaimard first described this species in 1827 [5], and, furthermore, examined broader public literatures, referring to the scyphomedusa present in the Alboran Sea and the Strait of Gibraltar. Additionally, this study includes photos taken by citizens from the Canary Islands, Agadir (Morocco), up to

the Southwest coast of Portugal, Strait of Gibraltar and the Alboran Sea. A total of 152 *R. luteum*, 6 *R. pulmo* and 10 *C. tagi* sightings were compiled. 103 photography were taken by citizens, 3 sighting were compiled from the project “Campaña Medusas” by the Spanish Ministry of Environment, 18 media reports were included documenting beaching of the giant jellyfish, 16 photos and videos were obtained directly from the Internet (YouTube, Flickr, blogs, Facebook, etc.) and 4 observations were downloaded from open access databases. Moreover, field data of *R. luteum* were collected between October 2013 and October 2015 in the region of La Herradura, Coast of Granada, NE Alboran Sea (36.7211° N, 3.7266° W) and data of *R. pulmo* were collected during 2012 in Doñana National Park, Gulf of Cádiz (36.7300° N, 3.7631° W).

RESULTS AND DISCUSSION

The results of this investigation confirm that *R. luteum* (Fig. 1) is not such rare specie in the coastal water of the West and South coasts of the Iberian Peninsula and West and North shores of Africa. In the past 17 years, we were able to confirm more than 150 observations of *R. luteum*. A total of 15 of *R. luteum* were sampled throughout a period of two years, showing a tendency of smaller animals during December - January and larger sizes in Autumn.



Fig. 1. *Rhizostoma luteum*

Observations by citizens of *R. luteum* between 1998 and 2015 indicate that from 2011 on, there was a significant increase in sightings, being 2015 (with 36 observations) and 2014 (with 33 sightings) the years with the most abundance. On the other hand, the limited data obtained in our survey about the occurrence of *R. pulmo* (Fig. 2), shows that this species was present during 2012 in the Gulf of Cádiz and seemed to have been more abundant in the 1990s in the NE Alboran Sea, although this issue needs further investigation.

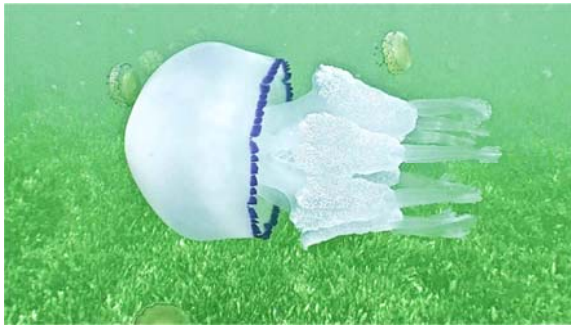


Fig. 2. *Rhizostoma pulmo*

Nonetheless, this study confirms the frequent misidentification of *R. luteum* in the past two decades with the sibling specie *R. pulmo* in the Alboran Sea and the similar *C. tagi* in the adjacent Atlantic Ocean coastal regions.

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REFERENCES

- 1 - Mayer AG, 1910. *Medusae of the World. Vol. 3, The Scyphomedusae*. Carnegie Institution, Washington, pp 735.
- 2 - Grenacher H & Noll FC, 1876. *Beiträge zur Anatomie und Systematik de Rhizostomeen*. Abhandlungen der Senckenbergischen Naturforschung Gesellschaft, 10, Frankfurt am Main, pp 79.
- 3 - Kramp PL, 1961. Synopsis of the medusae of the world. *Journal of the Marine Biological Association of the United Kingdom*, 40:378.
- 4 - Prieto L, Armani A & Macias D, 2013. Recent strandings of the giant jellyfish *Rhizostoma luteum* Quoy and Gaimard, 1827 (Cnidaria : Scyphozoa : Rhizostomeae) on the Atlantic and Mediterranean coasts. *Marine Biology*, 160:3241-3247.
- 5 - Quoy JRC & Gaimard JP, 1827. *Observations zoologiques faites à bord de l'Astrolabe en mai 1826, dans le détroit de Gibraltar*. Annales Sciences Naturelles 10:175-176.