

New finding of living specimens of the rare architectonicid *Heliacus (Gyriscus) jeffreysianus* (Tiberi, 1867)

Rino Stanic* (✉) & Stefano Schiaparelli#

* Mihanoviceva 36,
21000 Spalato, Croazia,
rinostanic@hotmail.com,
(✉) Corresponding
Author

Università degli Studi
di Genova, Dip. Te. Ris.,
Corso Europa 26,
16132 Genova, Italy

Abstract

The new record of a couple of specimens of the rare architectonicid *Heliacus (Gyriscus) jeffreysianus* (Tiberi, 1867) is reported from the Croatian coasts of the Adriatic Sea. This is the first finding of *H. jeffreysianus* after its description. The species is therefore confirmed as living in the Mediterranean Sea and its distribution, previously limited to an unknown locality from off Southern Sardinia, results considerably enlarged. The external morphology of the species conforms to architectonicids' Bauplan. Soft parts coloration is similar to that of other *Heliacus* species, and differs from that of other architectonicids (e.g. *Architectonica* spp.) in lacking the black pigmentation in the cephalic tentacles.

Riassunto

Viene riportato il ritrovamento di due esemplari viventi del raro architectonicide *Heliacus (Gyriscus) jeffreysianus* (Tiberi, 1867) per l'isola di Dobri (Arcipelago delle Pakleni), situata nei pressi dell'Isola di Hvar, in Croazia. Questo nuovo record conferma la presenza della specie in Mediterraneo ed allarga considerevolmente l'area di distribuzione, in precedenza limitata ad una località del sud della Sardegna. Questo ritrovamento è particolarmente degno di nota in quanto è il primo dopo l'istituzione della specie, la quale non è più stata rinvenuta per 140 anni. I due esemplari, mantenuti in acquario, hanno permesso di effettuare osservazioni sulla morfologia generale della specie che risulta in linea con quanto noto per gli Architectonicidae. La colorazione delle parti molli appare simile a quella di altri *Heliacus*, e differente da quella del genere *Architectonica*, in quanto manca la pigmentazione scura nei tentacoli e nella parte anteriore del piede. Gli esemplari sono stati rinvenuti su di uno zoantario di profondità, tipico di secche od ambienti rocciosi profondi. Lo stile di vita criptico e l'elevata profondità a cui si rinviene la specie sembrano essere le ragioni alla base della sua estrema rarità.

Key words

Architectonicidae, *Heliacus (Gyriscus) jeffreysianus*, Adriatic Sea, new record.

Introduction

Heliacus jeffreysianus (Tiberi, 1867) is an extremely rare architectonicid that is known for three specimens only, collected in South Sardinia at the end of 19th century, and never found again (Melone & Taviani, 1984). These specimens allowed Tiberi to establish the new genus *Gyriscus*, currently considered as a subgenus of *Heliacus* Orbigny in Sagra, 1842 (Bieler, 1993).

This subgenus includes very few architectonicid species, characterized by a tall spire, rounded and bulging whorls, and a very narrow to almost absent umbilicus (Bieler, 1993). These are (Bieler & Petit, 2005): *Heliacus (Gyriscus) asteleformis* (Powell, 1965), described from New Zealand, *Heliacus (Gyriscus) hayashii* Shikama, 1970 from Japan and *Heliacus (Gyriscus) worsfoldi* Quinn, 1981 from Bahamas. However, according to Bieler (1993) *Heliacus (Gyriscus) hayashii* Shikama, 1970 should be regarded as a synonym of *Heliacus (Gyriscus) asteleformis* (Powell, 1965), reducing to a total of three (considering the Mediterranean one) the number of species that can be included into this highly distinctive genus. The reasons for such a scattered occurrence are unknown, as is for many aspects of the basal ecology of the group (Bieler, 1993).

During a deep dive off Spalato, on a shoal at about 60 metres depth, a couple of specimens of *H. jeffreysianus* where found by the first Author on their host, a deep water zoanthid. Aim of the present contribution is the description of the soft parts and the shell of this species, based on living material, while the description of the association will be considered in a separate paper (Schiaparelli & Stanic in prep.).

Material and Methods

The two *H. jeffreysianus* specimens were obtained on September 24th 2006 during a deep dive off Spalato, at the island of Dobri in the Pakleni Archipelago (Fig. 1), close to Island of Hvar, on a shoal which has the top at 56 metres. The specimens were seen underwater on their host, a deep water zoantid, and were collected in order to take a photographic documentation. The specimens were placed in an aerated aquarium at the temperature of 15 °C until the following day, when these were photographed with a Nikon D-200, equipped with 60 mm lens. Soft parts nomenclature is according to Healy (1998); shell features according to Bieler (1993). Shells and opercula of both specimens are in the collection of the first Author.



Fig. 1. Map of the study site, where the specimens of *H. jeffreysianus* were found.

Fig. 1. Ubicazione dell'area da cui provengono gli esemplari di *H. jeffreysianus*.

Results

The two specimens measured 9,1 (diameter) X 12,0 (height) mm (**Fig. 2**) and 9,7 (diameter) X 12,2 (height) mm, respectively. The external morphology, as it can be observed in freely crawling specimens, is typical for the family (**Fig. 2 a, 2 d**). The anterior part of the foot is in fact divided into two pointed and very mobile lobes (**Fig. 2 a, alp**), while the head shows two slender cephalic tentacles carrying black eyes at their base. The overall coloration is bright yellow, with whitish to pale cream irregular mottles (**Fig. 2 d**), uniformly dispersed throughout the whole body surface except in the distal part of the cephalic tentacles. The acomb-like proboscis has never been protruded during the observations. The corneous rounded operculum is flat, almost fitting the shell aperture (**Fig. 2 e**). Contrarily to most architectonicids' opercula, the spirally arranged lamellae are not raised. In fact, these form a very distinctive sculpture, determined by a regular, series of flattened callosities (**Fig. 2 f**). The protoconch has the major diameter of about 1060 μ m and is separated by the early teleoconch by the typical varix-forming peritreme (Bieler, 1993); it is smooth, globous, whitish, but a light brown blotch can be observed at its very beginning, at least in one of the two specimens (**Fig. 2 c**).

Discussion and Conclusions

The recent record of two living specimens of *H. jeffreysianus* is particularly remarkable, since this species was previously known for the three individuals only, obtained from deep water bottoms from off Southern Sardinia and constituting the original lot studied by Tiberi (1867). The occurrence of the species along the Croatian coasts of the Adriatic Sea, considerably en-

large the distribution of the species which, besides its extreme rarity, seems to possibly have a rather broad range of occurrence. The large protoconch of about 1 mm, fitting the size range of those species with a planktotrophic development (Solsona & Martinell, 1996), supports the hypothesis of a potentially wide geographical distribution.

The origins of *H. jeffreysianus* are unknown (Melone & Taviani, 1984) and, although *Heliacus*-like shells are known since the Cretaceous (Bieler, 1993), no fossil relatives of this species have been collected from Pliocene outcrops of the Mediterranean and Eastern Atlantic areas to date (Solsona & Martinell, 1996), preventing any reconstruction of speciation routes and biogeographical affinities. On the other hand, the few other species belonging to the subgenus *Gyriscus*, occurring in New Zealand, Japan and Caribbean, suggest a Tertiary origin of the group and a possible Tethyan relationship.

The acomb-like proboscis was never protruded during the observation in the aquarium, presumably due to the not natural environmental conditions, but the external morphology conforms to the general architectonicid Bauplan (Bieler, 1993).

The soft part coloration lacks the black pigmentation along the tentacles and the anterior part of the foot (the regions most exposed to during feeding activities) that seem to be the most recurrent colour pattern in architectonicids, especially of the species belonging to the genus *Architectonica* (Bieler, 1993). It reminds that of the Indo-Pacific species *Psilaxis radiatus* (Röding, 1798) (see Bieler, 1993: 122) and that of *Heliacus* (*Teretropoma*) *perrieri* Rochebrune, 1881 from Senegal (see Haszprunar, 1985: 35, figs 10-11).

To the present knowledge, the scattered occurrence and extreme rarity of *H. jeffreysianus*, may just be the result of its cryptic life-style, intimately linked to a deep water zoanthid host, typical of offshore shoals (Schiaparelli & Stanic, in prep.). It is presumable that more records will be added in the near future, as the exploration of these relatively unknown environments will be intensified.

Acknowledgements

We would like to thank Petronije Tasic for assistance during this study and Jure Ravlic for the pictures of *H. jeffreysianus*. We are also indebted to Rüdiger Bieler (Chicago Field Museum of Natural History) and Gerhard Haszprunar (Zoologische Staatssammlung München) for having revised and improved with their suggestions an early draft of the manuscript.

References

- BIELER R. & R.E. PETIT, 2005. Catalogue of Recent and fossil taxa of the family Architectonicidae Gray, 1850 (Mollusca: Gastropoda). *Zootaxa*, **1101**: 1-119.
- BIELER R., 1993. Architectonicidae of the Indo-Pacific (Mollusca, Gastropoda). *Abhandlungen des Naturwissenschaftlichen Vereins in Hamburg*. Gustav Fischer Verlag, Stuttgart. 376 pp.

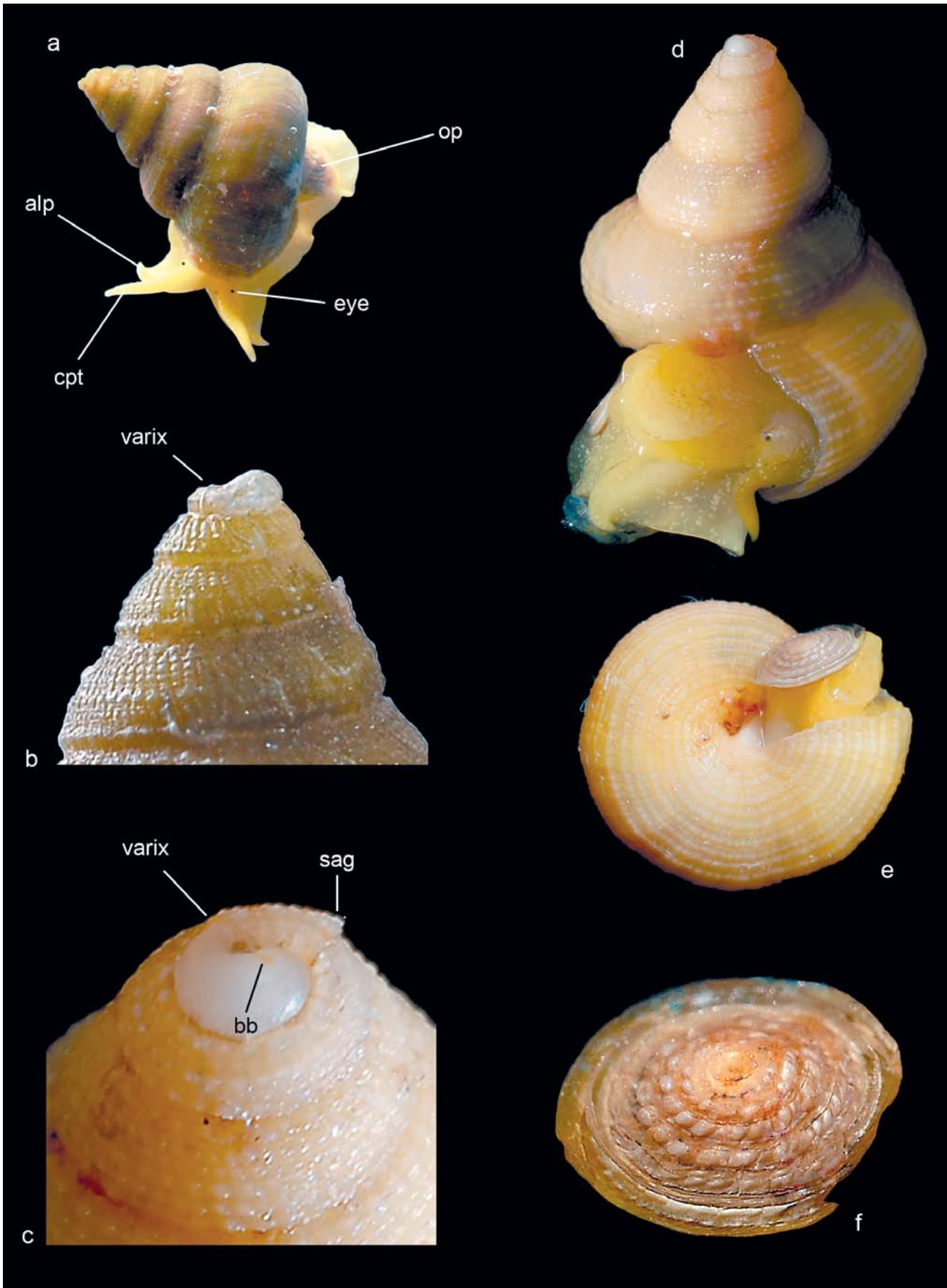


Fig. 2. Morphological features of *H. jeffreysianus*: **a.** A specimen crawling on the bottom of the aquarium. **b-c.** Different views of the protoconch; **d.** The second specimen, half retracted inside the shell: it is clearly visible the pigmentation on the foot; **e.** Bottom view of the same specimen; **f.** Particular of the operculum sculpture. Abbreviations (according to Bieler, 1993 and Healy, 1998): **alp** = antero-lateral process of foot; **bb** = brown blotch; **cpt** = cephalic tentacles; **ft** = foot; **op** = operculum; **sag** = stage of arrested growth.

Fig. 2. Caratteri morfologici di *H. jeffreysianus*: **a.** Un esemplare in movimento sul fondo dell'acquario. **b-c.** Vedute della protoconca; **d.** Il secondo esemplare, represso per metà dentro la conchiglia: è chiaramente visibile la pigmentazione del piede; **e.** Veduta basale dello stesso esemplare; **f.** Particolare della scultura dell'opercolo. Abbreviazioni (secondo Bieler, 1993 e Healy, 1998): **alp** = processo antero-laterale del piede; **bb** = macchia bruna; **cpt** = tentacoli cefalici; **ft** = piede; **op** = opercolo; **sag** = stadio di arresto della crescita.

- HASZPRUNAR G. 1985 Zur Anatomie und systematischen Stellung der Architectonicidae (Mollusca, Allogastropoda). *Zoologica Scripta*, **14** (1): 25-43.
- HEALY J.M., 1998. Superfamily Architectonicoidea. Pp. 858-862 in BEESLEY P.L., ROSS G.J.B., WELLS A. (eds.) *Mollusca: The Southern Synthesis. Fauna of Australia*. Vol. 5. CSIRO Publishing, Melbourne, Part A, 563 pp.
- MELONE G. & M. TAVIANI, 1984. Revisione delle Architectonicidae del Mediterraneo. *Lavori S.I.M.*, **21**: 149-192.
- POWELL A.W.B., 1965. New Zealand molluscan systematics with descriptions of new species: Part 5. *Records of the Auckland Institute and Museum*, **6** (2), 161-168.
- QUINN J.F., JR., 1981. The gastropods *Calliostoma orion* Dall, 1889 (Trochidae) and *Heliacus (Gyriscus) worsfoldi* n. sp. (Architectonicidae), from the Bahama Islands. *The Nautilus*, **95** (3), 150-156.
- SHIKAMA T., 1970. On some noteworthy Mollusca from Southwestern Japan (II). *Science Reports of the Yokohama National University*, section 2, **16**: 19-27.
- SOLSONA M. & J. MARTINELL, 1996. Distribution of Architectonicidae (Heterobranchia, Gastropoda) of the Western Mediterranean Pliocene: ecological and historical considerations. *Palaeogeography, Palaeoclimatology, Palaeoecology*, **126**: 281-290.
- TIBERI N., 1867. Diagnose du nouveau genre Méditerranéen *Gyriscus*. *Journ. De Conch.*, **15**: 303.