

Brachiopoda of Greece: an annotated checklist

Vasilis Gerovasileiou[‡], Nicolas Bailly[‡]

[‡] Institute of Marine Biology, Biotechnology and Aquaculture, Hellenic Centre for Marine Research, Heraklion, Greece

Corresponding author:

Academic editor: Christos Arvanitidis

Abstract

Background

Until today, only scattered species records of Brachiopoda from Greece have been included in publications on the Mediterranean brachiopod fauna. These records were mostly based on material collected during marine expeditions in the eastern Mediterranean decades ago, while few recent additional records appear in ecological studies. The aim of this paper was to give the first checklist of brachiopod species of Greece, in the framework of the Greek Taxon Information System (GTIS) initiative of the LifeWatchGreece Research Infrastructure (ESFRI), by reviewing the existing literature.

New information

Twelve brachiopod species have been found in Greek waters so far. The nomenclature, distribution, fossil records, ecology, and literature sources are discussed for each species.

Keywords

Aegean Sea, Sea of Crete, Levantine Sea, Ionian Sea, Eastern Mediterranean

Introduction

Until Logan's revision of the Mediterranean Brachiopoda (Logan 1979), several records of their extant taxa from the eastern Mediterranean were scattered in old publications on molluscs and in general benthic studies (see Logan et al. 2002 for a detailed publication list). Brachiopod records from Greece were mostly based on material that was collected

during the oceanographic expeditions of the French research vessels "Calypso" and "Jean Charcot" in the 1950's and 1960's (Logan 1979, Logan et al. 2002). Since then, few ecological studies on the sciaphilic hard substrate communities reported on Brachiopoda from Greek waters (e.g. Antoniadou and Chintiroglou 2005, Taviani et al. 2011, Gerovasileiou et al. 2015). The aim of the present study was to give an updated, annotated list of Brachiopoda of the Greek seas.

Materials and methods

The checklist of Brachiopoda of Greece (Suppl. material 1) was created in the framework of the Greek Taxon Information System (GTIS) initiative of the LifeWatchGreece Research e-Infrastructure (Bailly et al. 2016, this special collection). Its construction was initially based on the species lists of Mediterranean Brachiopoda compiled by Logan (1979) and Logan et al. (2002). All records in these lists were cross-checked against the World Register of Marine Species (WoRMS Editorial Board 2016) and the Brachiopoda Database (Emig et al. 2016) in order to update taxonomy and nomenclature. Records and information published since 2002 were incorporated in the list. The list is annotated with information regarding species distribution in the Greek seas (i.e. North Aegean, South Aegean, Levantine Sea, Ionian Sea), ecological remarks (i.e. depth and habitat), and the relevant literature sources. Information about fossil records of Brachiopoda from Greece was extracted from Logan et al. (2004), Nielsen et al. (2006), Koskeridou (2007), and references therein. The classification follows WoRMS and Emig et al. (2013).

List of brachiopod species found in Greek waters

Class Craniata

Order Craniida

Family Craniidae

***Novocrania anomala* (Müller, 1776)**

Distribution: North Aegean, South Aegean, Levantine Sea, Ionian Sea

Horizon: Pleistocene, Pliocene, Holocene

Notes: Recorded by Logan (1979), Morri et al. (1999), Logan et al. (2002), Gerovasileiou et al. (2015). **Habitat/Substrate:** Caves, precoralligenous,

coralligenous, bioconcretions, banks, boulders, muddy sand, coarse sand. Depth: 2-150 m.

***Novocrania turbinata* (Poli, 1795)**

Nomenclature:

Doubtful species, may be a synonym of *N. turbinata*. See discussion.

Distribution: South Aegean

Horizon: Holocene

Notes: Recorded by Logan and Long (2001). Habitat/Substrate: boulders. Depth: 65-150 m.

Class Rhynchonellata

Order Terebratulida

Family Cancellothyrididae

***Terebratulina retusa* (Linnaeus, 1758)**

Distribution: Levantine Sea

Horizon: Pleistocene, Pliocene, Holocene

Notes: Recorded by Logan (1979), Logan et al. (2002). Habitat/Substrate: Grey-yellow muds. Depth: 421 m. Remarks: Species record was based on a single poorly preserved specimen.

Family Kraussinidae

***Megerlia truncata* (Linnaeus, 1767)**

Distribution: North Aegean, South Aegean, Levantine Sea, Ionian Sea

Horizon: Pleistocene, Pliocene, Miocene, Holocene

Notes: Recorded by Logan (1979), Logan et al. (2002), Taviani et al. (2011). Habitat/Substrate: Rocks, precoralligenous, coralligenous, bioconcretions, *Madrepora-Lophelia* rudstone, gravel, shells, detritus, coarse sand, muddy sand, mud. Depth: 29-762 m.

Family Megathyrididae

***Argyrotheca cistellula* (Wood, 1841)**

Distribution: South Aegean, Levantine Sea, Ionian Sea

Horizon: Pleistocene, Holocene

Notes: Recorded by Logan (1979), Logan et al. (2002). **Habitat/Substrate:** Caves and overhangs. Depth: 6-30 m.

***Argyrotheca cuneata* (Risso, 1826)**

Distribution: North Aegean, South Aegean, Levantine Sea, Ionian Sea

Horizon: Pleistocene, Holocene

Notes: Recorded by Logan (1979), Simboura et al. (1995), Morri et al. (1999), Logan et al. (2002). **Habitat/Substrate:** Caves, overhangs, offshore rocks, coralligenous, bioconcretions, banks, gravel, coarse sand, muddy sand. Depth: 2-210 m.

***Joania cordata* (Risso, 1826)**

Distribution: North Aegean, South Aegean, Levantine Sea, Ionian Sea

Horizon: Pleistocene, Pliocene, Holocene

Notes: Recorded by Logan (1979), Simboura et al. (1995), Morri et al. (1999), Logan et al. (2002). **Habitat/Substrate:** Caves, overhangs, offshore rocks, coralligenous, bioconcretions, banks, gravel, coarse sand. Depth: 6-135 m.

***Megathiris detruncata* (Gmelin, 1791)**

Distribution: North Aegean, South Aegean, Levantine Sea, Ionian Sea

Horizon: Pleistocene, Pliocene, Holocene

Notes: Recorded by Logan (1979), Morri et al. (1999), Logan et al. (2002), Antoniadou and Chintiroglou (2005). **Habitat/Substrate:** Caves, overhangs, rocky shoals, precoralligenous, coralligenous, bioconcretions, banks, gravel, mud. Depth: 10-180 m.

Family Platidiidae

***Platidia anomioides* (Scacchi & Philippi, 1844, in Philippi, 1844)**

Distribution: Levantine Sea

Horizon: Holocene

Notes: Recorded by Logan (1979), Logan et al. (2002). **Habitat/Substrate:** mud. **Depth:** 115-180 m.

***Platidia davidsoni* (Eudes-Deslongchamp, 1885)**

Nomenclature:

Doubtful species, may be a synonym of *P. anomioides*. See discussion.

Distribution: North Aegean

Horizon: Holocene

Notes: Recorded by Logan (1979). **Habitat/Substrate:** Coralligenous. **Depth:** 108-112 m.

Family Terebratulidae

***Gryphus vitreus* (Born, 1778)**

Distribution: North Aegean, South Aegean, Levantine Sea, Ionian Sea

Horizon: Holocene

Notes: Recorded by Logan (1979), Logan et al. (2002), Taviani et al. (2011). **Habitat/Substrate:** *Madrepora-Lophelia* rudstone, *Lophelia-Madrepora* rubble, pelagic mudstone and wackestone, silty sand, sandy mud, mud. **Depth:** 130-2,133 m.

Family Incertae familiae

***Gwynia capsula* (Jeffreys, 1859)**

Distribution: North Aegean

Horizon: Holocene

Notes: Recorded by Antoniadou and Chintiroglou (2005). **Habitat/Substrate:** Hard substrate in sciaphilic algal community. **Depth:** 15-40 m.

Discussion

The checklist of Brachiopoda of Greece comprises 12 species classified into 9 genera, 6 families, 2 orders, and 2 classes. *Novocrania turbinata* and *Platidia davidsoni* have been included in the list as doubtful species. Logan and Long (2001) separated the species *N. turbinata* and *N. anomala*, which had been synonymized for a long period. Emig (2014) made a synthesis on the issue and, on the basis of molecular data analyzed by Cohen et

al. (2014), he concluded that the two species were synonyms. However, he mentions in his discussion that the lack of comprehensive study on morphological characters hinders the conclusion, especially concerning the eastern Mediterranean basin. The synonymy of *P. davidsoni* with *P. anomiooides* has been also questioned (A. Logan, pers. comm.). Thus, we chose to keep the two species in the list until their status is completely clarified.

The only recent addition to the brachiopod diversity of Greece is the species *Gwynia capsula* (Antoniadou and Chintiroglou 2005). Logan et al. (2004) had attributed the fact that this species was not found in the eastern basin either to the eastward Mediterranean faunal impoverishment or to the limited research effort in this area on this phylum. Indeed, *G. capsula* was reported one year later by Antoniadou and Chintiroglou (2005), on hard substratum sciaphilic assemblages (15-40 m) in the North Aegean.

In the Greek seas, Brachiopoda have been recorded in habitats ranging from dimly lit hard substrata of the sublittoral zone (e.g. caves and coralligenous assemblages) to bathyal muddy bottoms and deep-water coral facies.

Overall, the brachiopod fauna of the Greek seas comprises 85% of the Mediterranean brachiopod species, being considerably richer than in the other countries of the eastern basin: 5 species have been reported to date from Turkey (Çinar 2014, Gönülal and Güreşen 2014), Cyprus, and Lebanon, and 2 species from Israel (Logan 1979, Logan et al. 2002). No endemic brachiopods have been found in the Greek seas. Nevertheless, given the low number of studies focusing on dark habitats in the area, further research is expected to increase our knowledge on the brachiopod fauna of the eastern Mediterranean.

Acknowledgements

This work was supported by the LifeWatchGreece infrastructure (MIS 384676), funded by the Greek Government under the General Secretariat of Research and Technology (GSRT), ESFRI Projects, National Strategic Reference Framework (NSRF). We would like to thank Alan Logan and Nikolaos Lampadariou for their constructive comments.

References

- Antoniadou C, Chintiroglou C (2005) Biodiversity of zoobenthic hard-substrate sublittoral communities in the Eastern Mediterranean (North Aegean Sea). *Estuarine, Coastal and Shelf Science* 62 (4): 637-653. <https://doi.org/10.1016/j.ecss.2004.09.032>
- Bailly N, Gerovasileiou V, Arvanitidis C, Legakis A (2016) Introduction to the Greek Taxon Information System (GTIS) in LifeWatchGreece: the construction of the Preliminary Checklists of Species of Greece. *Biodiversity Data Journal*

LifeWatchGreece: Research infrastructure (ESFRI) for biodiversity data and data observatories: in press.

- Çınar ME (2014) Checklist of the phyla Platyhelminthes, Xenacoelomorpha, Nematoda, Acanthocephala, Myxozoa, Tardigrada, Cephalorhyncha, Nemertea, Echiura, Brachiopoda, Phoronida, Chaetognatha, and Chordata (Tunicata, Cephalochordata, and Hemichordata) from the coasts of Turkey. *Turkish Journal of Zoology* 38: 698-722. <https://doi.org/10.3906/zoo-1405-70>
- Cohen B, Kaulfuss A, Lüter C (2014) Craniid brachiopods: aspects of clade structure and distribution reflect continental drift (Brachiopoda: Craniiformea). *Zoological Journal of the Linnean Society* 171 (1): 133-150. <https://doi.org/10.1111/zoj.12121>
- Emig CC (2014) *Novocrania turbinata* synonyme de *N. anomala*. *Notebooks on Geology* 14: 159-171. <https://doi.org/10.4267/2042/53979>
- Emig CC, Bitner MA, Alvarez F (2016) Brachiopoda Database. http://paleopolis.es/brachiopoda_database
- Emig CC, Bitner MA, Álvarez F (2013) Phylum Brachiopoda. *Zootaxa* 3703 (1): 75-78. <https://doi.org/10.11646/zootaxa.3703.1.15>
- Gerovasileiou V, Chintiroglou C, Vafidis D, Koutsoubas D, Sini M, Dailianis T, Issaris Y, Akritopoulou E, Dimarchopoulou D, Voultsiadou E (2015) Census of biodiversity in marine caves of the Eastern Mediterranean Sea. *Mediterranean Marine Science* 16: 245-265. <https://doi.org/10.12681/mms.1069>
- Gönülal O, Güreşen SO (2014) A list of macrofauna on the continental shelf of Gökçeada Island (northern Aegean Sea) with a new record (*Gryphus vitreus* Born, 1778) (Brachiopoda, Rhynchonellata) for the Turkish seas. *Journal of the Black Sea / Mediterranean Environment* 20 (3): 228-252.
- Koskeridou E (2007) Pliocene brachiopods from Rhodes Island (Cape Vagia section). *Bulletin of the Geological Society of Greece* XXXX: 80-86.
- Logan A (1979) The recent Brachiopoda of the Mediterranean Sea. *Bulletin Institute Oceanographique Monaco* 72: 1-112.
- Logan A, Long SL (2001) Shell morphology and geographical distribution of *Neocrania* (Brachiopoda, Recent) in the eastern North Atlantic and Mediterranean Sea. In: Long SL, Howard C, Brunton C, Robin L., Cocks M (Eds) *Brachiopods: present and past*. 63. [ISBN 978-0-7484-0921-1]. <https://doi.org/10.1201/9780203210437.ch8>
- Logan A, Bianchi CN, Morri C, Zibrowius H (2004) The present-day Mediterranean brachiopod fauna diversity, life habits, biogeography and paleobiogeography. *Scientia Marina* 68: 163-170. <https://doi.org/10.3989/scimar.2004.68s1163>
- Logan A, Bianchi CN, Morri C, Zibrowius H, Bitar G (2002) New records of recent brachiopods from the eastern Mediterranean Sea. *Annali del Museo Civico di Storia Naturale "G. Doria" XCIV*: 407-418.
- Morri C, Bianchi CN, Cocito S, Peirano A, De Biase AM, Aliani S, Pansini M, Boyer M, Ferdeghini F, Pestarino M, Dando P (1999) Biodiversity of marine sessile epifauna at an Aegean island subject to hydrothermal activity: Milos, eastern Mediterranean Sea. *Marine Biology* 135 (4): 729-739. <https://doi.org/10.1007/s002270050674>
- Nielsen JK, Hanken N-, Nielsen JK, Hansen KS (2006) Biostratigraphy and palaeoecology of the marine Pleistocene of Rhodes, Greece: Scleractinia, Serpulidae, Mollusca and Brachiopoda. *Bulletin of Geosciences* 81 (3): 173-196. <https://doi.org/10.3140/bull.geosci.2006.03.173>

- Simboura N, Zenetos A, Thessalou-Legaki M, Pancucci M-, Nicolaidou A (1995) Benthic communities of the infralittoral in the N. Sporades (Aegean Sea): a variety of biotopes encountered and analysed. *Marine Ecology* 16 (4): 283-306. <https://doi.org/10.1111/j.1439-0485.1995.tb00413.x>
- Taviani M, Vertino A, López Correa M, Savini A, De Mol B, Remia A, Montagna P, Angeletti L, Zibrowius H, Alves T, Salomidi M, Ritt B, Henry P (2011) Pleistocene to Recent scleractinian deep-water corals and coral facies in the Eastern Mediterranean. *Facies* 57 (4): 579-603. <https://doi.org/10.1007/s10347-010-0247-8>
- WoRMS Editorial Board (2016) World Register of Marine Species. <http://www.marinespecies.org>

Supplementary material

Suppl. material 1: Checklist of Brachiopoda of Greece

Authors: Vasilis Gerovasileiou, Nicolas Bailly

Data type: Taxonomic checklist

Brief description: Taxonomic checklist of Brachiopoda known to occur in Greek waters.

Filename: GTIS_Brachiopoda_Greece_Checklist.xls - [Download file](#) (196.00 kb)