Biodiversity Journal, 2022,13 (4): 865–868 https://doi.org/10.31396/Biodiv.Jour.2022.13.4.865.868

Pliocene *Caryophyllia* Lamarck, 1801 (Anthozoa Scleractinia) from the Metauro river (Fano, Marches, Italy)

Valeriano Spadini[1*] & Francesco Pizzolato[2]

[1] Via A. Toti 4, 52046 Lucignano, Arezzo, Italy
[2] via Cimabue, 54 52100 Arezzo, Italy
*Corresponding author, e-mail: spadiniv@inwind.it

ABSTRACT A species of *Caryophyllia* Lamarck, 1801 (Anthozoa Scleractinia) is studied. It was collected at Bellocchi in the bed of the Metauro River, near the industrial area of Fano (Marches, Italy), where the river has eroded Plio-Pleistocene sediments, about 6 km from its mouth. The fauna collected at the site consisted of a few species of deep-bottom-dwelling molluscs and a single species of scleractinian. The *Caryophyllia* described has particular features, but until an adequate number of specimens in good condition becomes available, its nomenclature is left open.

KEY WORDS *Caryophyllia*; *Ceratocyathus*; Pliocene; Metauro river; Marches, Italy.

Received 08.06.2022; accepted 12.10.2022; published online 30.12.2022

INTRODUCTION

During the Pliocene, the genus *Caryophyllia* had numerous species belonging to the nominal subgenus and to the subgenus *Ceratocyathus* Seguenza, 1864 (species type *C. simplex* Seguenza, 1864). *Caryophyllia* s.s. are characterized by a variably broad base and grow on hard substrates (shells, stones). *Ceratocyathus*, characterized by a narrow base, usually lives on soft bottoms at great depths. Some authors (Pourtalés, 1880; Vaughan & Wells, 1943; Zibrowius, 1980; Cairns 1994; Kitahara et alii, 2010) argue that the name *Ceratocyathus* should not be used, but the present study concurs with Chevalier (1961), Vertino (2003) and Spadini (2015, 2019) who consider *Ceratocyathus* to be a subgenus of *Caryophyllia*.

Seguenza (1864) includes 35 species from the Plio-Pleistocene of southern Italy in the subgenus *Ceratocyathus*, but these species are rarely cited by other authors. Species of *Ceratocyathus communis* Seguenza, 1896 and *C. zancleus* Seguenza, 1986 are cited by Simonelli (1895) and Russo (1980) from the Pliocene of Ponticello di Savena; *Caryophyllia* (*Premocyathus*) *polymorpha* Seguenza, 1864 from Pliocene of Castellarquato and Ponticello di Savena (Simonelli, 1895; Montanaro, 1931). *Caryophyllia communis* Seguenza, 1864 is reported from the Tortonian of the stream Fumola (Trentino) (Boschele et al. 2021). Spadini (2015, 2019) reports *C. simplex* from the Pliocene of Siena and Estepona. Undetermined or incomplete specimens of *Ceratocyathus* can be found in sediments of the Pliocene of Romagna (Spadini et al, 2020) and in the Pliocene of Piedmont (unpublished data).

The purpose of this note is to report and describe a species of *Ceratocyathus* with pentameral symmetry not found in other Pliocene species of this subgenus.

MATERIAL AND METHODS

The study material was collected in the bed of the Metauro river at Bellocchi (Italy): 43° 46' 52.57'' N., 13° 00' 18.19'' E.

Coral fossil samples were collected manually and were cleaned and brushed with water and hydrogen peroxide to remove sediment. Identification was performed on the basis of macro and micromorphological characters related to corallum shape, disposition of radial elements, corallite diameter and columella.

The material is kept in the collection of one of the authors (FP, inventory number MET A 1/3).

ABBREVIATIONS. H = maximum height; D = maximum diameter; d = minimum diameter; Sx = septa of cycle x (S1, S2, etc.) Px = pali of cycle x (P3).

Geological setting

The formations emerging near Fano belong to the Umbria-Marche succession, of which the most recent (Miocene to middle Pliocene) emerge. The most ancient formation dates to the Langhian-Serravallian (Schlier) and consists of marl, whitish at the base and grayish at the top, with clay content towards the top of the geological series. The Messinian succeeds the Schlier, with the Gessoso-Solfiera and Colombacci formations. Finally, in continuity, the overlying Pliocene formations have clayey and sandy lithofacies. The sediments eroded by the Metauro river consist essentially of blue marly clays, also silty, sometimes slightly sandy and dating to the Pliocene (Selli, 1954). These massive clays are covered with layered clays and pelites, bearing ichthyolites.

The fauna is composed mainly of molluscs: bivalves and gastropods. Gastropod species collected, all quite rare, include *Aporrahais peralata* (Sacco, 1890), *Nassarius spinulosus* (Philippi, 1844), *Scaphander punctostriatus* (Michels, 1841) and *Pseudavena olivoides* (De Cristophori & Jan, 1832). Bivalves include *Bathyspinula excisa* (Philippi, 1844), *Bentharca asperula* (Dall, 1881), *Asperarca nodulosa* (Muller, 1776) and *Propeamussium* sp. (Smith, 1885). Other reported species are *Lunatia helicina* (Brocchi, 1814), *Nassarius italicus* (Mayer, 1876) and *Kelliella miliaris* (Philippi, 1844). This fauna can probably be dated to the Piacenzian, although many species are also common in the Gelasian stage. This fauna is linked to bathyal environments, probably at depths of several hundred meters, under the influence of the psychrosphere (Tabanelli, 1993, 2015).

RESULTS

Systematic palaeontology

Subclassis HEXACORALLIA Haeckel, 1866
Ordo SCLERACTINIA Bourne, 1900
Subordo CARYOPHYLLIINA Vaughan & Wells, 1943
Familia CARYOPHYLLIIDAE Dana, 1846
Subfamilia CARYOPHYLLIINAE Dana, 1846
Genus *Caryophyllia* Lamarck, 1801
Subgenus *Ceratocyathus* Seguenza, 1864

***Caryophyllia* (*Ceratocyathus*)** sp.

MATERIAL EXAMINED. One complete and four incomplete specimens.

DESCRIPTION. Coral of small size (H = 8.8 mm), ceratoid to trochoid in shape, with curvature from the plane of the minor axis. Theca with rather light granulation. Costae corresponding to S1 and S2 more evident and raised from the base, the others not very evident. Slightly oval calice (10.5 x 8.9 mm), with slightly scalloped outline, exserted in correspondence with the dominant septa. Septa, 40 in number, arranged regularly in four complete cycles and ten equal systems. Septa thin, S1 = S2; S3 paliferous, S4 very thin. P3 robust (P3 = S3), well separated from S3, with very thin margins, about as wide as the septum, decorated with pointed granules. Simple columella composed of a few twisted laminar elements that merge together.

REMARKS. Among the Pliocene species of *Ceratocyathus*, this is the only one with pentameral symmetry. The specimen described is similar to *C. simplex* (Seguenza, 1864), but is distinguished by different symmetry, by a different S3/P3 ratio and by curvature from the plane of the minor axis. With regard to other species of *Ceratocyathus* with pentameral symmetry, the Metauro species can be compared to *C. cornucopia* Michelotti, 1833, from the Middle Miocene and Tortonian of Piedmont

Figure 1. *Caryophyllia* (*Ceratocyathus*) sp., Pliocene of Metauro river (Bellocchi, Fano, Italy).

(Chevalier, 1962), originally described as *Trochocyathus*, later assigned to *Caryophyllia* by Chevalier (1962). The latter differs from the Pliocene species by virtue of a more ceratoid form, a more elliptical calice (d/D = 0.77) (Milne Edwards & Haime, 1848) and S3<S4 (Chevalier, 1962). Until a greater number of specimens in a good state of conservation can be examined and compared, the nomenclature of this *Caryophyllia* from the Metauro river is left open.

ACKNOWLEDGEMENTS

We thank Cesare Tabanelli (Ravenna, Italy) for information on the stratigraphic setting of this area and Helen Ampt (Siena, Italy) for revising the English.

REFERENCES

Boschele S., Dominici S., Bernardi M. & Avanzini M., 2021. Fossili cenozoici della Valsugana. Catalogo della "Collezione Boschele", parte VII. Studi Trentini di Scienze Naturali, 101: 5–52.

Cairns S.D., 1994. Scleractinia of the temperate North Pacific. Smithsonian Contributions to Zoology, 557: 150 pp.

Chevalier J.P., 1962. Les madreporaires du Pliocene d'Orosei (Nuoro, Sardaigne). Bullettin de la Société Geologique de France, 3: 266–270.

Kitahara M.V., Cairns S.D. & Miller D.J., 2010. Monophyletic origin of *Caryophyllia* (Scleractinia, Caryophylliidae), with descriptions of six new species. Systematics and Biodiversity, 8: 91–118. https://doi.org/10.1080/14772000903571088

Pourtalès L.F., 1880. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Caribbean Sea, 1878-79, by United States coast survey steamer Blake. VI. Report on the corals and Antipatharia. Bulletin of the Museum of comparative zoology, 6: 95–120.

Russo A., 1980. The psychrospheric coral fauna from the Lower Pliocene of Northern Italy. Acta Paleontologica polonica, 25: 613–617.

Selli R., 1954. Il Bacino del Metauro. Descrizione geologica, risorse minerarie, idrogeologia, Giornale di geologia, 24: 1–293.

Simonelli V., 1895. Antozoi pliocenici del Ponticello di Savena presso Bologna. Paleontographia Italica, 1: 149–168.

Spadini V., 2015. Sclerattiniari del Pliocene senese. Accademia delle scienze di Siena detta de' Fisiocritici, 13: 160.

Spadini V., 2019. Pliocene scleractinians fauna of Estepona (Malaga, Spain). Atti della Società Toscana di Scienze Naturali, Memorie, Serie A, 126: 75–94.

Tabanelli C., 1993. Osservazioni ed ipotesi sulle malacofaune plioceniche della Romagna. Quaderno di Studi e Notizie di Storia Naturale della Romagna, 2: l–20.

Tabanelli C., 2015. Segnalazione di *Admete viridula* (Fabricius) nel Piacenziano e nel Gelasiano del Bacino Padano Mediterraneo: osservazioni sul suo significato paleoclimatico e paleobiogeografico. Quaderno di Studi e Notizie di Storia Naturale della Romagna, 41: 9–23.

Vaughan T.W. & Wells J.W., 1943. Revision of the suborders, families and genera of the Scleractinia. Geological Society of America, Special Papers, 44: 1–394.

Vertino A., 2003. Sclerattiniari plio-pleistocenici e attuali del Mediterraneo (Sistematica, Biostratinomia e Paleoecologia). Università degli Studi di Messina. Dottorato di Ricerca In Scienze Ambientali: Ambiente Marino e Risorse (XV ciclo). (non pubblicata), Messina, 306 pp.

Zibrowius H., 1980. Les Scléractiniaires de la Méditerranée et de l'Atlantique nord-oriental. Memoires de l'Institut Océanographique, Monaco, 11: 284 pp.