

# First record of the genus *Corallium* (Cuvier, 1798) from the Pliocene of Monte Calcinaio (Siena, Italy)

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**ABSTRACT** Some fragments of *Corallium* (Cuvier, 1798) are reported from the Pliocene of Monte Calcinaio (Radicofani, Siena, Italy). This is the first report of a species of this genus from the Pliocene of the Siena-Radicofani basin.

**KEY WORDS** Octocorallia; *Corallium*; Pliocene; Radicofani sub-basin; Tuscany.

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## INTRODUCTION

Coralliid corals (Cnidaria Octocorallia Gorgonaria Scleraxonia) are characterized by a stony calcium carbonate axis bearing a thin cortical layer, by calcitic sclerites inserted in the coenecyme tissues and by soft polyps (Tu et al., 2016). Coralliidae systematics has been revised on the basis of molecular phylogenetic analysis and detailed morphological studies. Currently, 37 species are assigned to three genera: *Corallium*, *Hemicorallium* and *Pleurocorallium*. Since *Paracorallium* (Bayer & Cairns, 2003) is not considered a valid genus, the type species, characterized by deep round pits with prominently beaded margins, was assigned to *Corallium* by the scholars who most recently revised the family (Tu et al., 2016). Species of the genus *Corallium* are found in all oceans, from the tropics to high latitudes and at all depths. The Mediterranean currently hosts *Corallium rubrum* Linnaeus, 1758 which has been collected for jewellery since ancient times due to the colour and texture of its skeleton.

The most ancient fossil species seems to be *Corallium inaequale* De Angelis, 1894 from the “Tongri-

ano” (Oligocene) of Sassello, but this report requires verification. The most common fossil species is *Corallium rubrum* (Linnaeus, 1758), reported repeatedly from the Miocene to the Pleistocene of the Mediterranean basin (Vertino et al., 2010). Other species are *Corallium pallidum* Michelin, 1841 (= *C. sepultum* Michelotti, 1847) and *C. sulcatum* Michelotti, 1871, both from the Miocene of Piedmont and in need of revision in relation to their differentiation from *C. rubrum*. Osasco (1895) reports *Corallium rubrum* from the Pliocene of Asti, whereas Montanaro (1931) reports *Corallium sulcatum* from Piacenziano of San Venanzio and Coppi (1881), *Corallium* sp. from Puianello. Seguenza (1964) reports two species: *C. rubrum* from the “Pleistocene” of Scoppo and Trapani and *C. pallidum* from “Miocene” limestone of Gravitelli, Scoppo and Trapani.

## MATERIAL AND METHODS

### *Geological setting*

The material studied is from Monte Calcinaio,

in the Radicofani sub-basin (Tuscany, Italy). Marine sedimentation in this area began in the Zanclean with deposition of deep-sea clays on Miocene continental sediments (Bonini & Sani, 2002). The clayey and sandy deposits of the Monte Calcinaio, containing neritic microfauna, are interspersed with thin layers of gravel, conglomerate or limestone breccia (Liotta, 1996). The irregularly shaped clasts are made up of materials derived from the Mesozoic carbonate succession of Monte Cetona. These breaches are interpreted as landslides from coastal slopes that were rapidly repro-

cessed in an off-shore environment (Pascucci et al., 2006).

The direction of the paleocurrents indicates provenance of these materials from the south-east in the lower Pliocene and from the east in subsequent phases (Liotta, 1996; Pascucci et al., 2006). The microfaunal association in the Radicofani Basin has been attributed to the *Globorotalia margaritae-puncticulata* biozone of the Zanclean (Bossio et al., 1992; Pascucci et al., 2006). For other general characteristics of this site and its coral fauna, see Spadini (2015, 2016, 2018, 2020, 2021).



Figure 1. *Corallium* sp., Pliocene of Monte Calcinaio, Radicofani (Siena, Italy) (Scale bar 10 mm).

## RESULTS

### Systematics

Classis ANTHOZOA Ehrenberg, 1834

Ordo ALCYONACEA Verrill, 1865

Familia CORALLIIDAE Lamouroux, 1812

Genus *Corallium* Cuvier, 1798

Type species: *Madrepora rubra* Linnaeus, 1758

### *Corallium* sp.

**MATERIAL EXAMINED.** Monte Calcinaiolo. Three fragments. Measurements of the largest branch: Length: 24.4 mm; diameter: 2.7–3.1 mm; Cavity diameter: 1–1.5 mm; Width of the ribs: 0.2–0.25 mm.

**DESCRIPTION.** The material found consists of three fragments, the largest of which is 24.4 mm in length with a maximum diameter of about mm 3.1 mm. The second fragment measures 12.5 mm and matches the first perfectly in all characters. The third consists of a terminal fragment of a branch in a poor state of conservation. The largest fragment, which is also the best preserved, has a truncated branch halfway along its length. Opposite where the branch arises, there is a bulge about 3 mm in diameter containing a wide and deep cavity. The branch shows many elliptical cavities with diameters of 1–1.5 mm, occasionally round or drop-shaped, ranging from shallow to deep with unbordered margins. The branch is ornamented with costae, about 0.2 mm wide, separated by deep grooves.

**REMARKS.** Corallidae, very similar to *C. rubrum*, have certainly been present in the Mediterranean area since the Miocene. The Pliocene finds from Monte Calcinaiolo in the Province of Siena are also similar to *C. rubrum*. The literature documents the presence of other species of the genus *Corallium* correlated with deep fauna (Vertino et al., 2010), but these do not seem to be present in the area under examination.

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