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Rediscovery of "*Stylotrochus*" *gemmula* Seguenza, 1876 from the Early Pleistocene of Italy with notes on the genus *Calliotropis* Seguenza, 1902 (Gastropoda Seguenzioidea)

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ABSTRACT Recent field research in the Pleistocene marine sedimentary layers, exposed near Forte dei Centri, Salice (Messina, Sicily), has allowed to identify six shells, wich could be attribuited to *"Stylotrochus" gemmula* Seguenza, 1876 due to their peculiar morphological features. This species is here placed in the genus *Calliotropis* Seguenza L., 1902 (Gastropoda Seguenzioidea) and re-described according to a modern taxonomical approach. A specimen previously reported as *Turcicula distincta* Seguenza, 1879 for the Gelasian of Emilia-Romagna is here attributed to *Calliotropis gemmula* comb. nov., thus extending its distribution through the Early Pleistocene of the Mediterranean. Furthermore, the distribution of *Calliotropis* species in the Mediterranean Plio-Pleistocene is here briefly discussed.

KEY WORDS Bathyal Gastropoda; Calliotropidae; Plio-Pleistocene.

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INTRODUCTION

The malacological researches of the Sicilian naturalist Giuseppe Seguenza (Messina, 1833-1889) have allowed the discovery of rich Plio-Pleistocene malacological associations. Di Geronimo (1991) lists as many as 363 new taxa enstablished by this author between the years 1858 and 1881.

Unfortunately, many of these taxa have been described in a very schematic way and in many cases without pictures. The progressive large urbanization of the city of Messina (Sicily, Italy) caused the destruction of many outcrops and type localities from where many taxa were described. Moreover, two further unfortunate important events, i.e. the loss of the main nucleus of the collection of this Author and the premature death of his son Luigi (1873-1908), who was working on the redescription of taxa instituted by his father (Seguenza, 1902; 1903), both due to the catastrophic earthquake of 1908, have made extremely difficult to malacologists the interpretation of many taxa established bt Seguenza (Bertolaso & Palazzi, 2000). However, the discovery, in recent times, of parts of collections with labels autographed by G. Seguenza and L. Seguenza, has allowed us to clarify the systematic position of many taxa described by the former, up to now unknown (Bertolaso & Palazzi, 2000). From the end of the second half of the 1900s to the present days, many authors dedicated their studies to the Plio-pleistocenic Seguenza's taxa. Among the most significant contributions on this subject,

in which many taxa have been reported and sometimes redescribed, we can cite here those of Micali & Villari (1986, 1989, 1990, 1991), Di Geronimo (1991), Palazzi & Villari (1994, 1995, 1996), Bertolaso & Palazzi (1994), Vazzana (1996), Di Geronimo & La Perna (1997), Ceregato & Tabanelli (2006) and Brunetti (2020). Some of these taxa currently still remained not easy to intepret.

This work is focused on one of those latter.

GEOLOGICAL SETTING

The fossil shell object of the present paper, comes from sandy levels of Salice (Contrada Coilare, Messina, Sicily, Italy), 38°14'51.15"N, 15°28'48.19"E, 322 m a.s.l.; included in the map "Messina" (F. 254, IV SO) of I.G.M.

The fossiliferous outcrop, attributed by G. Seguenza (1876a) to the "upper zone of the ancient Pliocene", was subsequently studied from a geological and stratigraphic point of view, by Bonfiglio (1969). The fossiliferous sands, based on the Foraminifera *Globorotalia truncatulinoides* (d'Orbigny, 1839) and *Hyalinea balthica* (Schröter, 1783), were attributed to the Early Pleistocene (Calabrian age). The rich deposit of fossils was rediscovered by Micali & Villari (1989), who gave a list of 84 species (including gastropods, bivalves and scaphopods), subsequently extended to 99 species (1991); after the first works, other species were added to the list (Rindone, 1991; Bertolaso & Palazzi, 1994; Palazzi & Villari, 1995; Dell'Angelo & Bonfitto, 2005). The list of fossils includes some taxa: *Chlamys islandica* (O.F. Müller, 1776), *Puncturella noachina* (Linnaeus, 1771) and *Buccinum humpreysianum* Bennett, 1824, which appeared in the Mediterranean during the Sicilian substage (Raffi, 1986).

The sandy successions of Salice are typical of bathyal environments with high hydrodynamism, whose malacofaunas contain peculiar elements of the bathyal muds (VP) and white corals biocenosis (CB) sensu Pérès & Picard (1964), with some displaced species from distal biocenosis.

MATERIAL AND METHODS

For the present work, sediment found in this locality were washed with tap water, dried in a low temperature oven and sieved. Then, shell specimens were picked out from the >1/2/3 mm fractions. The samples were examined and measured under a stereomicroscope, and photographed with a Canon EOS 700D camera with a Tamron 60mm lens, in multifocal shots. The pictures were processed with the combineZM software. Subsequently, images were converted to black and white, and the balance of lights and shadows was modified to obtain more contrasted images that highlight the morphological characteristics of the shells. The specimens were also examined uncoated under a LMU Tescan Vega Scanning Electron Microscope in Low Vacuum modality, to investigate its micromorphology.

The specimens here studied are now housed in the palaeontological collection of the Museo Civico di Storia Naturale di Comiso (Ragusa, Italy).

RESULTS

Systematic palaeontology

Classis GASTROPODA Cuvier, 1795
Subclassis VETIGASTROPODA Salvini-Plawen, 1980
Ordo SEGUENZIIDA Haszprunar, 1986
Superfamilia SEGUENZIOIDEA Verrill, 1884
Familia CALLIOTROPIDAE Hickman et McLean, 1990
Genus *Calliotropis* Seguenza, 1902
TYPE SPECIES. *Calliotropis ottoi* (Philippi, 1844)

Calliotropis gemmula (Seguenza, 1876) comb. nov. (Fig. 1)

Stylotrochus gemmula - Seguenza G., 1876b, pag. 188, n. 772, Messina
Trochus gemmula - Seguenza L., 1902, pag. 464; tav. XVII, fig 18, [Torrente] Trapani, Messina (Fig. 2)

ORIGINAL DESCRIPTION (Seguenza, 1876). "*Conchiglia conica, avvolgimenti concavi con due cingoli presso i margini e linee trasverse all'intersezione, papille prominenti acute, suture escavate; base con forte angolo papilloso e tre linee rilevate granose concentriche; avvolgimenti superiori con*

forti ed acute costole trasverse [Conical shell, concave whorls with two chords at the margins and transverse lines at the intersection, acute prominent papillae, excavated sutures; base with strong papillose angle and three raised concentric grainy lines; upper whorls with strong and acute transverse ribs]".

MATERIAL EXAMINED. ITALY • 6 specimens, Sicily: Salice, Messina, 38°14'51.15"N, 15°28'48.19"E, 322 m a.s.l., shells, MSNC 4913.

DESCRIPTION. Shell trochiform (Fig. 3) very small sized: 2,6 x 2 mm. Protoconch eroded. Teleoconch consists of 4 whorls, with a distinct scalloped suture. The first teleoconch whorl has a sculpture of thin prosocline axial ribs. Starting from the second whorl the prosocline axial ribs show two very little incipient spiral cords, forming slight protrusions at the intersection with ribs. Towards the penultimate whorl, the adapical cord splits in two nodular chords. Last whorls with an evident "bicarenated" adapical chord with nodules, which give to the shell a slighty pagoda-shaped outline. Base weakly convex, bearing three granular concentric cords. Umbilicus closed. Aperture rounded. Columella straight.

Another specimen has been here represented (Figs. 2–4) to document other views of the shell.

Many of the fossil shells from Salice show traces of rework and corrosion; the apices of many specimens have also been subject to recrystallization. For these reasons, the protoconchs of the 2 specimens here reported (Figs. 5, 6) are damaged and devoid of any morphological characters. However, the protoconch consisting of approximately of one whorl, with a globose and raised nucleus. The electron microscope photos also revealed a microsculpture of the teleoconch formed by an intricate network of oblong eyelets-like elements (Figs 7, 8).

DISCUSSION

As reported by Seguenza L. (1902), this species was established on a single incomplete and very small specimen (2.5 x 1.8 mm). He interpreted this specimen as a juvenile of a species attributable to an undefined subgenus of *Calliostoma*. We have no more information about this generic placement until Palazzi & Bertolaso (1994) considered "*Stylotrochus gemmula"* a probable juvenile form of *Putzeysia clathrata* (Aradas, 1847). They also excluded that "*Stylotrochus gemmula"* could be a *Solariella*, due to the presence of a closed umbilicus deducible from Seguenza's drawing (1902). The specimens found in the Salice outcrop clearly reject this last hypothesis. In fact, the morphological characteristics of the first whorls of the shell of *P. clathrata* (Reitano et al., 2022) appear very different from those shown by *Calliotropis gemmula* and the presence of "bicarenated whorls" as well as a closed umbilicus also dispels any doubt as concerns its collocation within the genus *Calliotropis* (Seguenza, 1902; Pérez et al, 2022). In recent times Tabanelli (2008) figured a specimen of *Turcicula distincta* Seguenza, 1879, for the Gelasian of Rio Chié (Brisighella, Ravenna), here considered attributable to *C. gemmula* for the morphology, sculpture and size of the shell. In the same paper he reported *T. distincta* for the Pliocene of the valley of the Lamone river, near Santerno (Ravenna), and affirms to have represented the best preserved specimen of all those found. *Lischkeia (Turcicula) distincta* has already been previously reported for the Pliocene of Rio Albonello (Tabanelli & Segurini, 1995). This suggests that this Author has interpreted the species here discussed, *C. gemmula*, as *T. distincta.* Moreover, if confirmed that the material assigned to *T. distincta* from Romagna is really attributable to *C. gemmula*, the possible range of distribution of this species will be extended to the Late Pliocene-Early Pleistocene. Awaiting clarifications, the only specimen depicted in Tabanelli (2008: table 1, figs. 4a-4b) is preferable to assign to *C. gemmula,* considering its distribution within the Early Pleistocene. Just from its original description *Trochus distinctus* (1897: pag. 271) could not be attributed to the genus *Calliotropis* Seguenza, 1902. In fact, compared to *Calliotropis ottoi* (Philippi, 1844), *T. distinctus* differs in having whorls bearing two orders of prominences, abapical and adapical, joined together by an oblique axial sculpture (Seguenza, 1902). *Calliotropis gemmula*, on the other hand, has three orders of tubercles, two of which in an adapical position and close together, a peculiar character appreciable from the original description of the genus *Calliotropis* Seguenza, 1902. *"Trochus" distinctus* remains a species of dubious interpretation, being known only from the original description and drawing of Seguenza G. The placement of *"Stylotrochus gemmula"* in *Calliotro-*

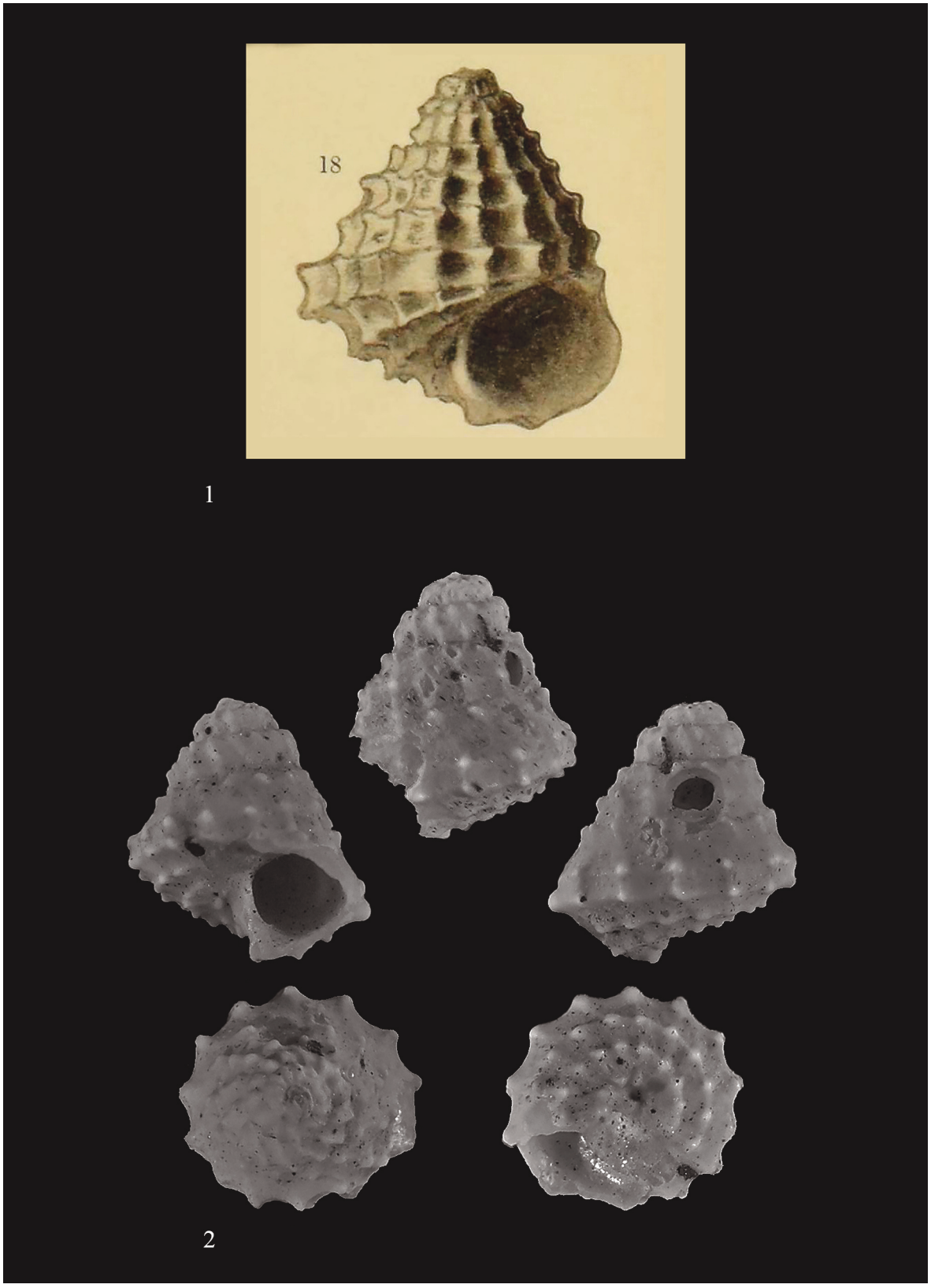
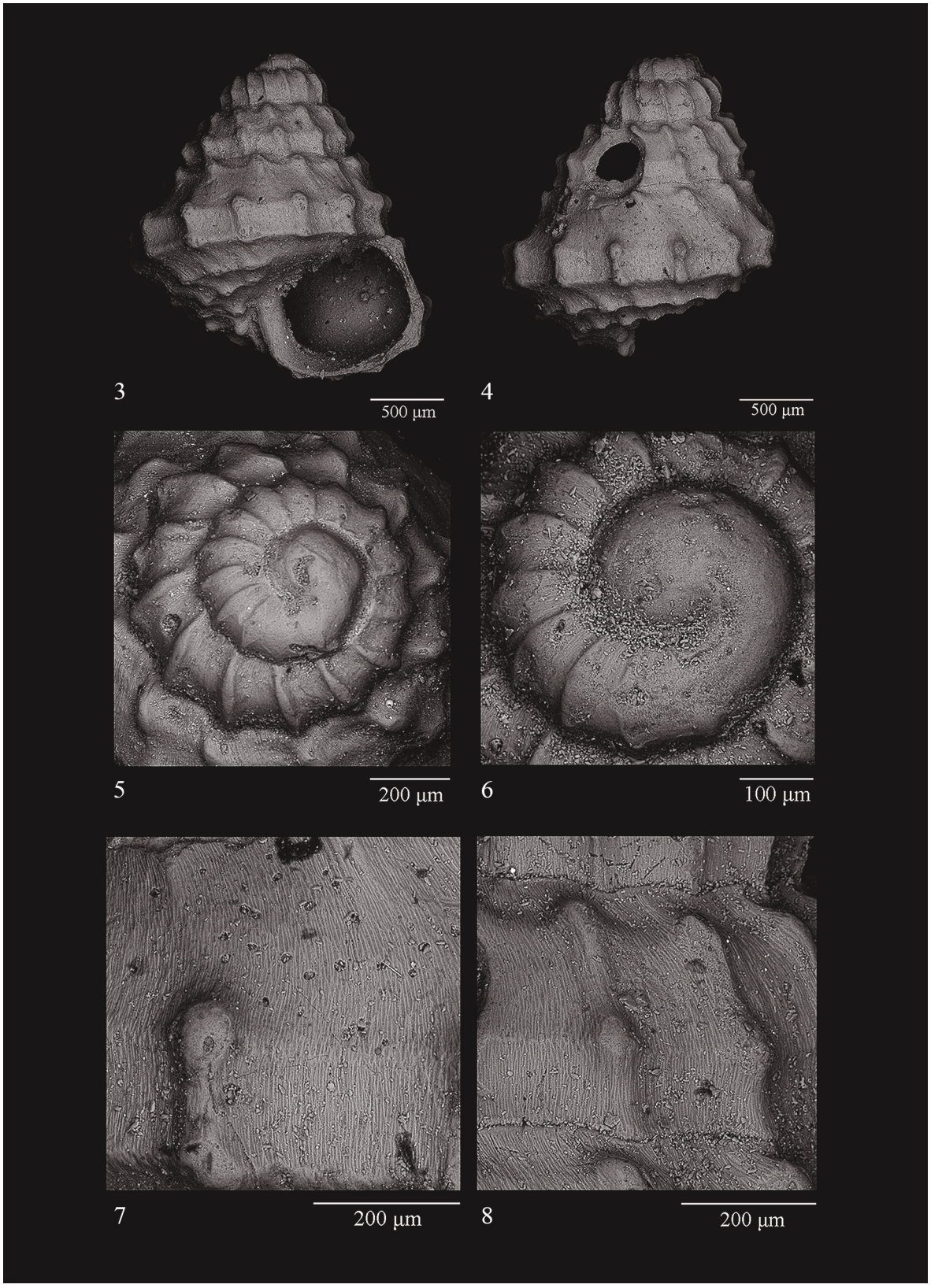


Figure 1. Original drawing of "*Trochus gemmula*" by L. Seguenza (1902).
Figure 2. Specimen of *Calliotropis gemmula* from Salice (Messina, Sicily, Italy).



Figures 3, 4. Specimens of *Calliotropis gemmula* from Salice (Messina, Sicily, Italy).
Figures 4, 5. Details of the protoconchs. Figures. 6, 7. Details of the micromorphology of teleoconch.

pis here proposed increases to five the number of species of *Calliotropis* present in the Circalittoral-Bathyal paleocommunities of the Mediterranean Plio-Pleistocene: *C. gemmula* (Seguenza, 1876), *C. ottoi* (Philippi, 1844), *C. peregrina* (Libassi, 1859), *C. architectonica* (Lozano-Francisco & Vera-Pelàez, 2002) and *Calliotropis penibetica* Vera-Pelàez, 2022.

Calliotropis ottoi is still an extant species, currently living in the north-central Atlantic (Abbot, 1974; Quinn, 1979; Colman & Tyler, 1988; Beck et al., 2006; Vilvens & Swinnen, 2008; Ibarrola et al., 2012;), reported for the Indian Ocean (Martens & Thiele, 1904) and known, as fossil, from the Plio-Pleistocene of Sicily and Calabria (Philippi, 1844; Aradas, 1847; Seguenza G., 1868; Cossmann, 1918; Glibert, 1962; Micali & Villari, 1986; 1989, 1991; Rindone & Vazzana, 1989; Palazzi & Villari, 1994, 1996; Vazzana, 1996; Bertolaso & Palazzi, 2000) in which it shows a marked intraspecific variability (var. *major* Seguenza, 1876b, var. *ornata* Seguenza, 1876b, var. *simplex* Sequenza, 1876b). In the Mediterranean it has been dredged in subfossil thanatocoenosis (Di Geronimo & Bellagamba, 1986; Nicolay & Angioy, 1988; Bonfitto et al., 1994; Ardovini & Cossignani, 1999; La Perna & D'Abramo, 2010; Cossignani & Ardovini, 2011; Romani et al., 2016).

Calliotropis peregrina is a fossil species from the Mediterranean Plio-Pleistocene (Libassi, 1859; Seguenza, 1876; Monterosato, 1877; Sacco, 1896; Cerulli-Irelli, 1916; Roman, 1940; Glibert, 1962; Pavia, 1975; Montefameglio et al. 1980; Robba, 1981; Di Geronimo et al.. 1982; Cavallo & Repetto, 1992; Tabanelli & Segurini, 1995; Vazzana, 1996; Bogi & Cauli, 1998; Borghi e Vecchi, 2001; Dominici, 2001; Ferrero Mortara et al., 2002; Repetto & Lacroce, 2004; Chirli, 2004; Sosso & Dell'Angelo, 2010; Chirli & Linse, 2011; Tabanelli et al., 2017; Tabanelli, 2018; Brunetti & Cresti, 2018; Vera-Pelàez, 2022).

Calliotropis architectonica is a fossil species known only from the Early Pliocene of Spain (Lozano-Francisco & Vera-Pelàez, 2002; Vera-Pelàez, 2022). *Calliotropis penibetica* is a fossil species known only from the Early Pliocene of Spain (Vera-Pelàez & Lozano-Francisco, 2022).

Finally, *C. gemmula* shows morphological affinities with *Calliotropis rivulensis* Lozouet, 1999 from the French bathyal upper Oligocene (Lozouet, 1999) which can be probably considered its ancestor.

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