

On two rare species of Plio-Pleistocene marine molluscs of the Mediterranean Basin

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ABSTRACT

During the study of the Plio-Pleistocene malacofaunas of the Mediterranean Basin, the presence of *Liamorpha elegans* (de Folin, 1870) was ascertained. This species has never been previously reported in sediments of the lower-middle Pliocene of central Italy and was reported only once in sediments of the upper Pleistocene (Tyrrhenian sensu Auctores) of southern Italy. Furthermore, the bivalve *Tugonia anatina* (Gmelin, 1791) was found in the Tyrrhenian of southern Spain. This is the second record in the upper Mediterranean Pleistocene after more than a hundred years; the specimen was compared with others, both from the Zanclean of the Guadalquivir Basin (Spain) and the Zanclean of Tuscany (Italy). Both species are discussed and illustrated.

KEY WORDS

Pliocene; Pleistocene; Pyramidellidae; Myidae

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INTRODUCTION

During research on the Plio-Pleistocene malacofaunas of the Mediterranean Basin, the presence of the species *Liamorpha elegans* (de Folin, 1870) was ascertained. This species was described in the past as belonging to the genus *Miralda* A. Adams, 1863. Its presence is confirmed in the upper Pleistocene of southern Italy, with new findings, and is also reported for the first time in the lower-middle Italian Pliocene. During the same research, specimens of the bivalve *Tugonia anatina* (Gmelin, 1791) were found in sediments of the Spanish upper Pleistocene, a species previously reported for this period, only once many years ago (Gignoux, 1913).

MATERIAL AND METHODS

The material examined, collected during surface research, comes from various Pliocene deposits, both in the Guadalquivir basin (Gonzales Delgado,

1985, 1988, 1989, 1993; Landau et al., 2011), and from the Zanclean/Piacenzian of central Tuscany (Brunetti & Della Bella 2006, 2008), the Tyrrhenian of Sicily (Ruggieri & Greco, 1965) and that of southern Spain (Torres et al., 2006). For the generic and suprageneric determinations we followed the WoRMS (2020).

ABBREVIATIONS AND ACRONYMS. H = maximum height of the shell, measured from the apex to the end of the siphon canal; L = maximum width of the valve; coll. = collection; ex = specimen/s; CMB = M. Mauro Brunetti collection.

MATERIAL AND METHODS

Systematics

Classis GASTROPODA Cuvier, 1797

Superfamilia PYRAMIDELLOIDEA Gray, 1840

Familia PYRAMIDELLIDAE Gray, 1840

Genus *Liamorpha* Pilsbry, 1898

Type species *Lia decorata* de Folin, 1873

Liamorpha elegans (de Folin, 1870) - Figs. 1, 2

Mathilda elegans de Folin, 1870: 212–213, tab. 26, fig. 11

Pyrgulina sculptatissima Dautzenberg, 1910: 67, tab. 3, figg. 15–16

Miralda elegans (de Folin, 1870) - Hoenselaar & Moolenbeek, 1990: p. 65 figg. 1–5

Miralda elegans (de Folin, 1870) - Crovato & Micali, 1990: p. 125, tab. 1, fig. 2

Chrysallida pulchra Jeffreys, 1874 - Gaglini, 1992: 138, fig 146 (*nomen nudum*)

Liamorpha elegans (de Folin, 1870) - Aartsen, Gittenberger & Goud, 1998: p. 9–11

Miralda elegans (de Folin, 1870) - Cossignani & Ardovini, 2011: p. 349 (figure not numbered)

Miralda elegans (de Folin, 1870) - Peñas, Rolan & Swinnen, 2014: p. 128, fig. 7 D–E

EXAMINED MATERIAL. Italy, Siena, Poggibonsi, località Cipressino, 1 ex, lower-middle Pliocene. Italy, Messina, Capo Milazzo, 2 ex, “Tirreniano”.

REMARKS. For the discussion of this taxon at a generic level, see Aartsen et al. (1998), with which we agree. The characteristic sculpture of the teleoconca (Fig. 1A) prevents confusing the species with any other, fossil and living. Despite this, Dautez-berg (1910) described it as a new *Pyrgulina sculptatissima*, while admitting the strong resemblance to de Folin’s species: “*Cette petite espèce est remarquable par sa sculpture très saillante, qui lui donne un aspect bien particulier. Il se pourrait qu'elle fût la même que celle qui a été décrite et figurée par le Marquis de Folin dans les Fonds de la Mer, I, p. 212, pi. XXVI, fig. 11, sous le nom de Mathilda elegans: la sculpture est, en effet, fort semblable, mais, par contre, il n'est pas fait mention, dans la description, du pli columellaire qui est bien visible sur nos échantillons et qui fixe la classification de ce Mollusque parmi les Odostomidés*”.

Even Gaglini (1992: 138), while describing *Chrysallida pulchra* Jeffreys, 1874, a name unusable in any case due to it being a nomen nudum, admitted: “*Non si può fare a meno di notare la rassomiglianza di questa specie con Miralda elegans*”. However, *Liamorpha elegans* features a quite variable teleoconch sculpture as specified also by Peñas et al.

(2014: 128): “*there are some differences between populations in relations to the number of spiral cords which are on the lower part of the last whorl and the number of the axial ribs on its upper part*”.

Until now, the fossil finds of *Liamorpha elegans* were limited to a single record for the Upper Pleistocene of southern Italy (Crovato & Micali, 1990), a presence confirmed in this contribution by the discovery of two further specimens of the Tyrrhenian of Capo Milazzo (Messina) (Fig. 1B). *Liamorpha elegans* is part of the typical warm fauna with Senegalese affinity described by various authors (Gignoux, 1913; Trevisan & Di Napoli, 1938; Mirigliano, 1953; Segre, 1954; Malatesta, 1954; Ruggieri & Bucceri, 1968; Settepassi, 1971; Ruggieri & Melone, 1975; Vazzana, 2008, Brunetti M., 2018). The specimen of the lower-middle Tuscan Pliocene was found in a characteristic sediment in *Petaloconchus* sp. previously described by Brunetti M. & Della Bella (2006, 2008). According to Peñas et al. (2014), the species ranges from Guinea Bissau to Angola, where it is frequently found, with bathyal distribution from the infralittoral to the circalittoral. So far there are only two reports for the Mediterranean Sea (Hoenselaar & Moolenbeek, 1990, Formentera & Gaglini, 1991: Sicily) and for Mauritania (van Aartsen et al., 1998; Cossignani & Ardovini, 2011).

Classis BIVALVIA Linnaeus, 1758

Ordo MYIDA Stoliczka, 1870

Superfamilia MYOIDEA Lamarck, 1809

Familia MYIDAE Lamarck, 1809

Genus *Tugonia* Gray, 1842

Type species *Mya anatina* Gmelin, 1791

Tugonia anatina (Gmelin, 1791) - Figs. 3, 4

Mya anatina Gmelin, 1791: 3221

?*Tugonia anatina* (Gmelin, 1791) - Hörnes, 1870: 32, tab. 6, figg 6a–b

?*Tugonia* (s. s.) *taltassei* Chavan, 1950: 31, fig. 1.

?*Tugonia* (s. s.) *sherborni* Glibert & van de Poel, 1966: 37

?*Tugonia* (s. s.) *sherborni* Glibert & van de Poel, 1971: 5, tab. 2, fig. 6.

Tugonia anatina (Gmelin, 1791) - Pantoli & Raffi, 1981: 73, tab. 1, figg. 1–20.

?*Tugonia* (*Tugonia*) *anatina* (Gmelin, 1790) - Santos & Mayoral, 207: 47, tab. 1, fig. 9.



Figures 1, 2. *Liamorpha elegans* (de Folin, 1870). Fig. 1: Cipressino (Poggibonsi, Siena, Italy) lower-middle Pliocene, H = 2.2 mm CMB X015. Fig. 2: Capo Milazzo (Messina, Italy), Tyrrhenian. H = 1.6 mm CMB X015A. Figures 3, 4. *Tugonia anatina* (Gmelin, 1791). Fig. 3: Roqueta de Mar (Almeria, Spagna), Tyrrhenian, right valve L = 25.2 mm CMBS726. Fig. 4: Santa Catalina (Huelva, Spain), Zanclean, right valve L = 23 mm CMBZ395.

Tugonia anatina (Gmelin, 1791) - Chirli, 2015: 132, tab. 30, figg. 5–7.

EXAMINED MATERIAL. Spain, Almeira, Roqueta de Mar, 1 ex, Tyrrhenian. Spain, Huelva, Santa Catalina, 20 ex, Zanclean. Italy, Siena, Poggibonsi, 5 ex.

REMARKS. This taxon too, due to the morphological characteristics of the valves, cannot be confused with other Plio-Pleistocene species. We were not able to examine current material, other than the material depicted in Pantoli & Raffi (1981). Thus we hypothesized that living and Plio-Pleistocene populations belong to the same species. The specimen found in the Spanish Upper Pleistocene (Fig. 3) does not show significant differences with other Italian and Spanish examples of the lower Pliocene (Fig. 4), except for a greater sturdiness of the shell and a radial sculpture with less close ribs. Still to be clarified, in my opinion, is the relationship be-

tween the Miocene species *Tugonia taltassei* Chavhan, 1950 from the Tortonian of Morocco and *Tugonia sherborni* Glibert & van de Poel, 1966 (Fig. 6), from the Portuguese upper Miocene, as well as the relationship with *Tugonia anatina* from Höernes (1870) for the Austrian Miocene and from Santos & Mayoral (2007) for the Portuguese Miocene. Whether all these species are valid or correspond to *Tugonia ornata* (Basterot, 1825) (Figs. 7, 8) is not the purpose of this paper. Only the examination and direct comparison of a greater number of specimens could definitively clarify the exact systematic position of the taxa treated. The specimen found comes from a layer of coarse sand mixed with reddish gravel (Fig. 5), one of the few Pleistocene deposits Roqueta del Mar (Almeria, Spain) that survived the reckless urbanisation in the area. On the same level, *Persistrombus latus* Gmelin, 1791 (= *Strombus bubonius* Lamarck, 1822) and *Conus ermineus* Born, 1778, (= *Conus testudinar-*

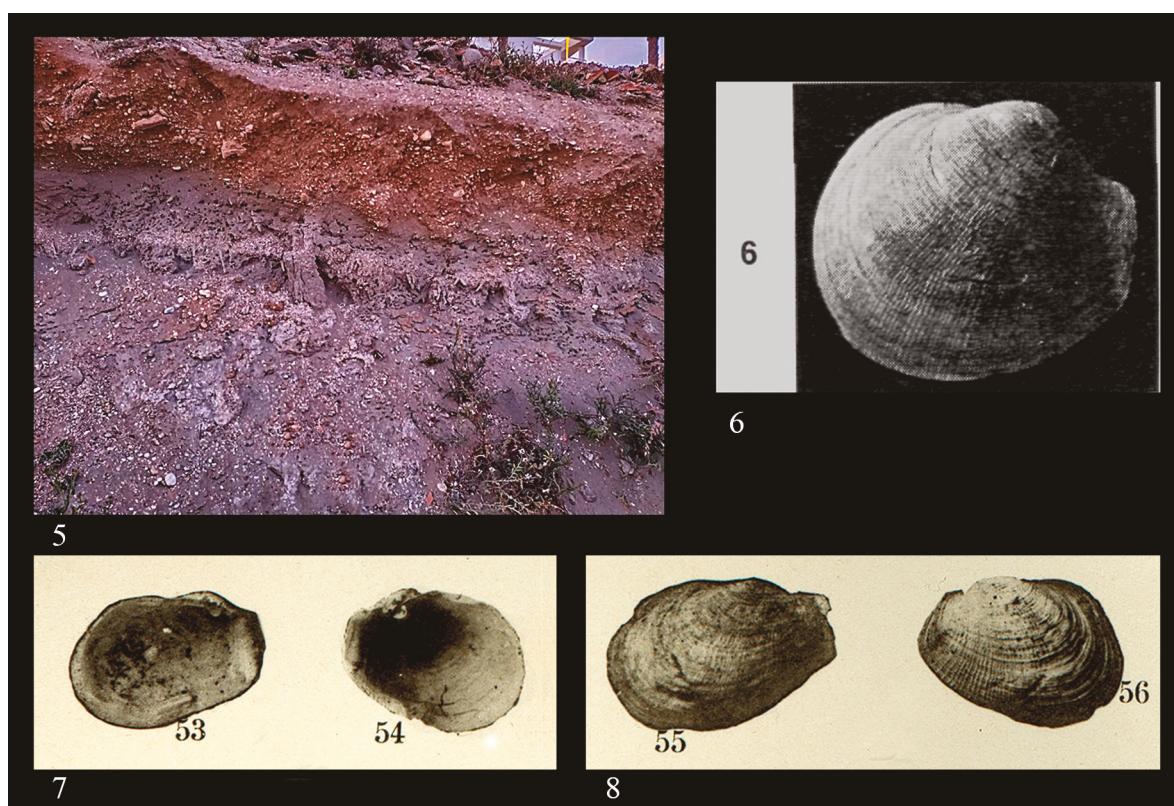


Figure 5. Geological level from which this specimen of *Tugonia anatina* comes. Figure 6. *Tugonia* (*s. s.*) *sherborni* Glibert & van de Poel, 1966, holotype, Adiça (Portogalo), Tortonian, left valve L = 20 mm, original figure from Glibert & van de Poel, 1971. Figures 7, 8. *Tugonia ornata* (Basterot, 1825) St. Avit (France) lower-middle Miocene, left valve L = 20.2 mm, right valve 18.2 mm.

ius Hwass in Bruguière, 1792) have been found which allows us to date the valve of *Tugonia anatina* the Tyrrhenian period. The species had previously been reported only once by Gignoux (1913) in the Tyrrhenian of Monastir (Tunisia). This further report confirms that *Tugonia anatina* belongs to the well-known group of species with Senegalese affinity of the upper Pleistocene of the Mediterranean Basin.

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REFERENCES

- Aartsen van J. J., Gittenberger E. & Goud J., 1998. Pyramidellidae (Mollusca, Gastropoda, Heterobranchia) collected during the Dutch Cancap and Mauritania expeditions in the south-eastern part of the North Atlantic Ocean (part 1). *Zoologische Mededelingen Leiden*, 321: 3–57.
- Cossignani T. & Ardovini R., 2011. *Malacologia Mediterranea*. Ancona, L'Informatore Piceno, 536 pp.
- Brunetti M.M. & Della Bella G., 2006. *Leufroyia ferrierii*: una nuova specie per il Pliocene toscano (Gastropoda: Conidae). *Bollettino Malacologico*, 42: 118–120.
- Brunetti M.M. & Della Bella G., 2008. *Macalia (?) kengii* n. sp. un nuovo bivalve per il Pliocene toscano (Tellinidae, Macominae). *Bollettino Malacologico*, 44: 115–118.
- Brunetti M.M., 2018. Two new records of fossil gastropods from the Italian upper Pleistocene. *Biodiversity Journal*, 9: 315–318.
- Chavan A., 1950. Sur la présence du genre *Tugonia* dans le Miocène supérieur marocain. *Cahiers géologiques de Thoiry*, 3: 31–32.
- Cossmann M. & Peyrot A., 1907–1934. *Conchologie néogenique de l'Aquitaine*. Actes de la Société Linéenne de Bordeaux, Bordeaux. Tome 63–86.
- Crovato C. & Micali P., 1990. Contributo alla conoscenza delle Chrysallidinae del Pliocene e del Pleistocene italiano. *Lavori S.I.M.*, 24: 119–133.
- Dautzenberg Ph., 1910. Mollusques marins. Mission Gruvel sur la Côte Occidentale d'Afrique (1909–1910). *Annales de l'Institut Océanographique*, Paris, Masson e C. Ed., 140 pp.
- de Folin L., 1870. Quelques points de la côte occidentale d'Afrique, de Gorée, au Cap Sainte-Anne. In: de Folin L. & Périer L. (Eds.), *Les Fonds de la Mer* 1(2), Savy, Paris, 316 pp.
- Gaglini A., 1991. Terze spigolature... Monterosatiane. *Argonauta*, 7: 125–180.
- Gignoux M., 1913. Les formations marines pliocénées et quaternaires de l'Italie du Sud et de la Sicile, Thèses Faculté des Sciences de l'Université de Lyon, I A. Rey, Lyon, 393 pp.
- Glibert M. & van de Poel L., 1971. Mollusques cénozoïques nouveaux ou mal connus. *Bulletin de l'Institut royal des Sciences naturelles de Belgique*, 47: 1–17.
- Gmelin J.F., 1791. Vermes. In: Gmelin J.F. (Ed.), *Carolus Linnaei Systema Naturae per Regna Tria Naturae*, Ed. 13. Tome 1(6). G.E. Beer, Lipsiae [Leipzig]. 3221 pp.
- Gonzales Delgado J.A., 1985. Estudio sistemático de los Gastéropodos del Plioceno de Huelva (SW de España). 1. Archeogastropoda. *Studia Geologica Salmanticensia*, 20: 45–77.
- Gonzales Delgado J.A., 1988. Estudio sistemático de los Gastéropodos del Plioceno de Huelva (SW de España). 3. Mesogastropoda (Scalacea-Tonnacea). *Studia Geologica Salmanticensia*, 25: 109–160.
- Gonzales Delgado J.A., 1989. Estudio sistemático de los Gastéropodos del Plioceno de Huelva (SW de España). 3. Neogastropoda (Muricacea-Buccinacea). *Studia Geologica Salmanticensia*, 26: 269–315.
- Gonzales Delgado J.A., 1993. Estudio sistemático de los Gastéropodos del Plioceno de Huelva (SW España). 5. Neogastropoda (Volutacea - Conacea). *Studia Geologica Salmanticensia*, 28: 7–69.
- Hoenselaar H.J. & Moolenbeek R.G., 1994. First records of *Miralda elegans* (De Folin, 1870) nov. comb. from the Mediterranean Sea (Gastropoda, Pyramidellidae). *Bollettino Malacologico*, 26(1–4): 65–66.
- Hörnes M., 1856–1870. Die fossilen Mollusken des Tertiär-beckens von Wien. *Abhandlungen der Kaiserlich-Königlichen Geologischen Reichsanstalt*, 4: 1–479.
- Landau B., Da Silva C.M. & Mayoral E., 2011. The Lower Pliocene gastropods of the Huelva Sands Formation, Guadalquivir Basin, Southwestern Spain. *Palaeofocus*, 4: 1–90.
- Malatesta A., 1954. Fossili delle spiagge Tirreniane. *Bollettino del Servizio Geologico d'Italia*, 76: 9–17.
- Mirigliano G., 1953. La macrofauna del Tirreniano di Gallipoli (Lecce). *Italian Journal of Zoology*, 20: 115–122.

- Pantoli D. & Raffi S., 1981. Presenza del genere *Tugonia* (Myidae, Bivalvia) nel Pliocene mediterraneo. Bollettino della Società Paleontologica Italiana, 20: 73–80.
- Peñas A., Rolan E. & Swinnen F., 2014. The superfamiglia Pyramidelloidea Gray, 1840 (Mollusca, Gastropoda, Heterobranchia) in West Africa, 11. Addenda 3. Iberus, 32: 105–206.
- Ruggieri G. & Greco A., 1965. Studi geologici e paleontologici su Capo Milazzo con particolare riguardo al Milazziano. Geologica Romana, 4: 41–88.
- Ruggieri G. & Buccheri G., 1968. Una Malacofauna tirreniana dell'isola di Ustica (Sicilia). Geologica Romana, 7: 27–58.
- Ruggieri G. & Melone G., 1975. La malacofauna del Tirreniano di Tommaso Natale (Palermo). Bollettino Società Paleontologica Italiana, 12: 217–222.
- Santos A. & Mayoral E., 2007. Paleoecología de la malacofauna de bivalvos del Mioceno superior de Cacela (SE Portugal). Treballas de Museu Geológico de Barcelona, 15: 25–49.
- Segre A.G., 1954. Il Tirreniano del golfo di Terranova Pausania (Olbia) e la sua fauna malacologica. Bollettino del Servizio Geologico d'Italia, 76: 43–84.
- Settepassi F., 1971. Atlante malacologico I molluschi marini viventi nel Mediterraneo. Vol. 2, Invag, 250 pp.
- Torres T., Ortiz J.E., Puche O., de la Vega R. & Arribas I., 2006. Biometría de *Strombus bubonius* Lamark 1791 del yacimiento de Cerro Largo (Roquetas de Mar, Almería). Geogaceta, 40: 167–170.
- Trevisan L. & Di Napoli E., 1938. Tirreniano, Siciliano e Calabriano nella Sicilia sudoccidentale. Estratto Giornale di Scienze Naturali ed Economiche, 39: 1–39.
- Vazzana A., 2008. *Ranilia constricta* (Milne Edwards, 1880) nel Tirreniano di Trumbacà vicino Reggio Calabria. Il Naturalista siciliano, 32: 381–388.
- WoRMS, 2020. <http://www.marinespecies.org/index.php> del 17/5/2020