

Additions to the gastropod fauna of the Pliocene of Estepona, southwestern Spain, 3. The genus *Plesiothyreus* Cossmann, 1888 (Phenacolepadidae), with a note on its presence in the Middle Miocene of Winterwijk, Miste, The Netherlands

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Plesiothyreus pliogenicus (Chirli, 2004) is added to the list of gastropods known from the Pliocene of the Estepona Basin. The presence of *Plesiothyreus* sp. from the Miocene of Winterswijk, Miste, The Netherlands is recorded for the first time. *Phenacolepas* Pilsbry, 1891 is considered a junior subjective synonym of *Plesiothyreus* Cossmann, 1888.

KEY WORDS: *Plesiothyreus pliogenicus*, Miocene, Pliocene, Estepona, southern Spain, Miste, The Netherlands.

Introduction

The Estepona assemblages seem to yield an inexhaustible fauna of gastropods. In this paper we report the presence of *Plesiothyreus pliogenicus* (Chirli, 2004) in the assemblage. Its presence in the lower Upper Pliocene of Estepona and its record in the early Pleistocene of Rhodes suggests that this recently described species had a wider stratigraphic and geographic distribution than previously thought. Moreover, the large number of individuals at hand from the Estepona assemblages poses questions on the generic attribution of the European Neogene Phenacolepadidae. We also take the opportunity to report the presence of the genus in the Middle Miocene of Winterswijk, Miste, The Netherlands.

Material and methods

The material described herein was collected from several of the Estepona localities, Velerín conglomerates, antenna and sands (see Landau *et al.*, 2003, text-fig. 1) representing a coastal intertidal environment, with numerous small gastropod specimens in a good state of preservation. These assemblages were dated as lower Piacenzian (lower Upper Pliocene) by Guerra Merchán *et al.* (2002), an age corroborated by the assemblage of Euthecosomata (Janssen, 2004).

Abbreviations:

NHMW Naturhistorisches Museum Wien, Vienna, Austria
EsVeCO Velerín conglomerates, Estepona (André Jansen collection)
EsVePA Velerín antenna, Estepona (André Jansen collection)
EsVeSA Velerín Sandy lens, Estepona (André Jansen collection)
RGM Naturalis Biodiversity Center, Leiden, The Netherlands
SA Sandy lens, Velerín, Estepona

The authors' names are abbreviated BML and AFJ in the text.

Systematic palaeontology

Subclass Neritimorpha Golikov & Starobogatov, 1975
Order Cycloneritimorpha Frýda, 1998
Superfamily Neritoidea Rafinesque, 1815
Family Phenacolepadidae Pilsbry, 1895
Genus *Plesiothyreus* Cossmann, 1888

Type species – *Capulus parmophoroides* Cossmann, 1885, by original designation (Eocene, France).

1834 *Scutella* Broderip, p. 446; type species (by sub-

- sequent designation, Gray, 1847): *Scutella crenulata* Broderip, 1834 (Recent, Indo-West Pacific region); invalid, junior homonym of *Scutella* Lamarck, 1816 (Echinodermata).
- 1847 *Scutellina* Gray, p. 168; type species (by typification of replacement name): *Scutella crenulata* Broderip, 1834 (Recent, Indo-West Pacific region); invalid, junior homonym of *Scutellina* Agassiz, 1841 (Echinodermata).
- 1888 *Plesiothyreus* Cossmann, p. 195.
- 1891 *Phenacolepas* Pilsbry, p. 89; type species (by typification of replacement name): *Scutella crenulata* Broderip, 1834; (Recent, Indo-West Pacific region); *nom. nov. pro Scutellina* Gray, 1847, *non* Agassiz, 1841 (Echinodermata).

Plesiothyreus pliogenicus (Chirli, 2004)

Figs 1-5

- 2004 *Neopilina pliogenica* Chirli, p. 18, pl. 7, figs 1-3.
- 2006 *Plesiothyreus pliogenicus* Chirli, 2004 [*sic*] – Chirli, p. 124, pl. 46, figs 1-6.
- 2011 *Plesiothyreus pliogenicus* (Chirli, 2004) – Chirli & Linse, p. 29, pl. 2, figs 2a-d.

Material – Maximum diameter 6.9 mm. EsVeCO (20); EsVeVA (7 + 4 incomplete); EsVeSA (100+). NHMW 2015/0235/0001-0003 (3), NHMW 2015/0235/0004 (2), all SA.

Discussion – As discussed by Landau *et al.* (2013, p. 37) the use of *Phenacolepas* Pilsbry, 1891 and *Plesiothyreus* Cossmann, 1888 is inconsistent. *Phenacolepas* was based on the extant species *Scutella crenulata* Broderip, 1834, *Plesiothyreus* was based on an Eocene species from the Paris Basin. Christiaens (1989) suggested that the two names were synonyms, *Plesiothyreus* having priority. Zuschin *et al.* (2009) accepted this opinion with some doubts for their Red Sea species.

We are not aware of any SEM studies of its type species *Plesiothyreus parmophoroides* (Cossmann, 1885). According to Y. Kano (personal communication, 2013 [BML]) it ‘has a posterior deck (like in *Septaria*) whilst ‘a vast majority of phenacolepadids’ ... ‘lack the deck as the type species *P. crenulata* does’.

In the Middle Miocene gastropod assemblage of Karaman, Turkey, (Landau *et al.* (2013), a couple of poorly preserved phenacolepadids were identified as *Phenacolepas ancyliformis* (Grateloup, 1828). The Turkish specimens were incomplete or juvenile, and did not have a well-developed posterior deck. They were placed in the genus *Phenacolepas* based on the protoconch and early teleoconch characters similar to those of extant *Phenacolepas*, as illustrated by Sasaki (1998). However, this identification may be incorrect. We have since examined a specimen of *P. ancyliformis* from the Atlantic Aquitanian Lower Miocene of France (Uzeste, Gironde, France; AFJ collection) and, like the specimen illustrated by Lozouet *et al.* (2001, pl. 5, fig. 2), it has a broad,

flattened posterior deck, which overhangs the interior, with regular denticle-like structures at the edge. This would place it within the genus *Plesiothyreus* rather than *Phenacolepas*. The illustration of the type species of *Plesiothyreus*, *P. parmophoroides* (Cossmann, 1888, pl. 7 fig. 14), suggests regular denticles on the deck edge, but finer than those seen in *P. ancyliformis*. A decision whether the Turkish specimens are conspecific or not will have to wait until better preserved material is available.

The species from Estepona has a very depressed shell, somewhat more depressed than the shells of *P. ancyliformis* studied. The posterior deck is not well-developed, narrow and does not overhang the interior as much as it does in *P. ancyliformis*. The edge of the deck is either smooth or bears small, weak and irregular tubercles. These tubercles never develop into the regular tooth-like structures seen in *P. ancyliformis*.

The presence or absence of these weak denticles at the deck edge, being an intraspecific feature, make us return to the initial question as to whether the separation of *Phenacolepas* and *Plesiothyreus* is justified based on only shell characters. At least some specimens of *P. crenulata* also seem to have weak denticles at the deck edge (AnimalBase, 2013). Therefore, it is questionable whether these phenacolepadids can be separated reliably into two groups based on these alleged generic differences (*viz.* the presence of a well-developed deck bearing denticles). We therefore agree with Christiaens (1989) that the two names are synonyms, *Plesiothyreus* having priority.

Cossmann & Peyrot (1919) described a second species from the Atlantic Lower Miocene Aquitanian of France; *P. sacyi*, which differs from *P. ancyliformis* in having coarse cancellate sculpture on the dorsum. Like *P. ancyliformis*, it has a deck with a denticulate edge.

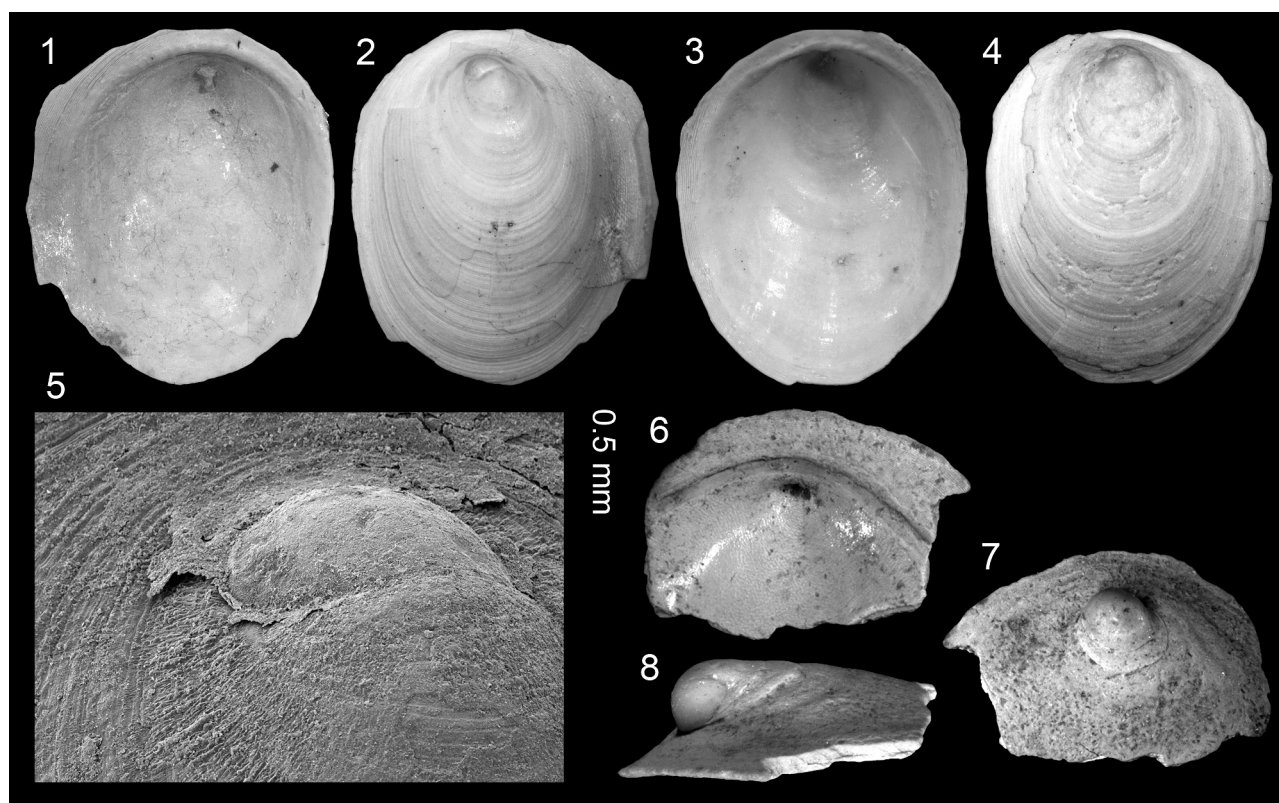
Distribution – Lower Pliocene: Italy (Chirli, 2004). Upper Pliocene: Estepona (this paper). Lower Pleistocene: Greece, Rhodes Formation, Kritika Member, Rhodes (Chirli & Linse, 2004).

Plesiothyreus sp.

Figs 6-8

Material – One fragment, maximum diameter 4.5 mm, RGM.794149 ex Anton C. Janse collection, Winterswijk, Miste, The Netherlands; Breda Formation, Aalten Member, Miste Bed; upper Burdigalian-Langhian, upper Lower to lower Middle Miocene.

Discussion – Despite extensive research into the Miste assemblage (Nordsieck, 1972; Janssen, 1984) new and interesting material is still to be found. In the most recent excavations (2013) a single fragment of a phenacolepadid was found (A.C. Janse leg.), in which the posterior portion is partially preserved. The apex is relatively small, smaller than in *Plesiothyreus pliogenicus*. The deck has a smooth inner edge, devoid of denticles, which distin-



Figs 1-5. *Plesiothyreus pliogenicus* (Chirli, 2004). **1-2.** NHMW 2015/0235/0001, maximum diameter 5.3 mm; **3-4.** NHMW 2015/0235/0002, maximum diameter 5.2 mm; **5.** NHMW 2015/0235/0003 (close up of protoconch; SEM). Velerin sands, Estepona, Spain, lower Piacenzian, lower Upper Pliocene.

Figs 6-8. *Plesiothyreus* sp. RGM.794149 (ex A.C. Janse coll.), maximum diameter fragment 4.5 mm, Winterswijk, Mist, The Netherlands; Breda Formation, Aalten Member, Mist Bed, upper Burdigalian-Langhian, upper Lower to lower Middle Miocene.

(photographs: Petra Sonius and Eduard de Vogel).

guishes it from *P. ancyliformis*. The outside is eroded, so possible sculpture is no more visible. Like the Turkish specimens, more material is required in order to make a definitive specific assignment.

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