

Notes on the systematics, morphology and biostratigraphy of fossil holoplanktonic Mollusca, 10. *Clio* (*Balantium*) *collina* spec. nov., for '*Clio* sp. ? an *Clio lavayssei*' non Rutsch, 1934 (Miocene, Italy)¹

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Clio collina spec. nov. is introduced for specimens from the Early Miocene (Burdigalian) of the Turin Hills in northern Italy. These were formerly identified as *Clio pedemontana* (non Mayer, 1868) or '*Clio* sp. ? an *Clio lavayssei*' (non Rutsch, 1934).

Key words: Gastropoda, Euthecosomata, Miocene, Burdigalian, Italy, systematics, new species.

INTRODUCTION

In Janssen (1995), discussing the rich holoplanktonic mollusc collection housed in the Dipartimento di Scienze della Terra of Torino, Italy, the indication '*Clio* sp. ? an *Clio lavayssei* Rutsch, 1934' was used for a number of specimens from the Miocene of the Turin Hills. The uncertainty in naming these specimens was predominantly caused by unfamiliarity with the true characters of Rutsch's species. Afterwards, however, we had the possibility to see the type material of that species, housed in the Naturhistorisches Museum, Basel, Switzerland. Subsequent study of these specimens indicated that the Italian samples are clearly different, and therefore belong to an undescribed species.

Clio (*Balantium*) *collina* spec. nov. (fig. 1)

Balantium (*Balantium*) *pedemontanum* (May.); Bellardi, 1873: 31, fig. 10a-c (partim, non Mayer).

Balantium Pedemontanum (*Cleodora*), Mayer; Tiberi 1878: 72 (non Mayer).

Balantium pedemontanum, Mayer sp. (*Cleodora*); Bellini, 1905: 38, figs 33-35 (redrawn after Bellardi, 1873) (partim, non Mayer).

Balantium pedemontanum (Mayer, 1868); Ferrero Mortara et al., 1982: 28 (partim, non Mayer).

Clio sp. ? an *Clio lavayssei* Rutsch, 1934; Janssen, 1995: 72, pl. 6 figs 2-4 (non Rutsch) (the magnification of fig. 2a-c is 3x, not 6x as mentioned in the explanation of the plate).

¹ For No. 7-9 in this series see Basteria 64: 35-50, 2000.

Holotype (fig. 1a-d). — Colln Dipartimento di Scienze della Terra, Torino, registration number BS 007.05.001.

Paratypes. — Specimens TTI 16.1, 16.2.12, 16.3-7 and 16.9-12, as specified in Janssen (1995: 73), all housed in the Torino collection.

Locus typicus. — Indicated as 'Colli Torinesi' (Turin Hills) (Italy, Piemonte).

Stratum typicum. — Unknown, but the arenitic sediment of the specimen might indicate that it originates from the Termô-Fôrà Formation, which is of Miocene (Burdigalian-Early Langhian) age.

Description. — Shell elongately triangular, large, fully-grown complete specimens must be over 3 cm in size. The lateral margins are gently flexuous in the apical shell part and straight towards the aperture. Close to the aperture the angle between the lateral margins is c. 25°. In one specimen there is a slight indication of a dorsal curvature of the apical shell part. The protoconch is still unknown.

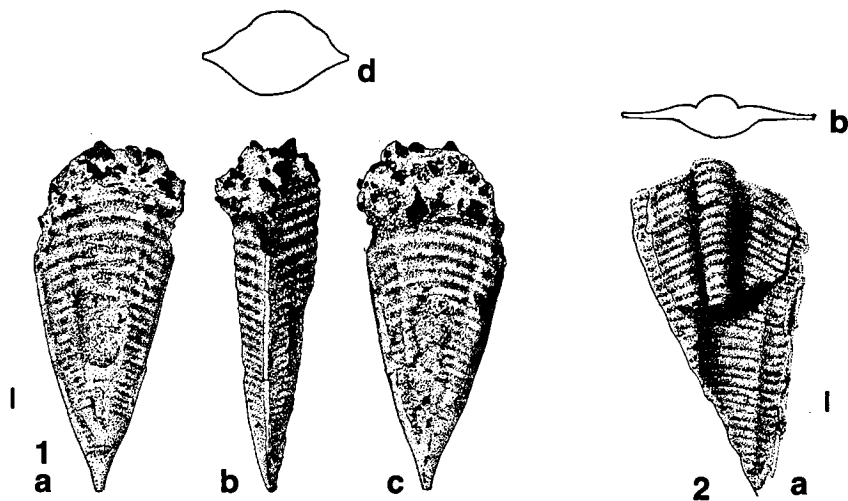
Both sides of the shell are convex, the dorsal one somewhat more so than the ventral. The dorso-ventral diameter (fig. 1d) equals half the shell width in fully-grown specimens, but in juvenile specimens the shell is relatively more swollen. On both sides of the shell a transverse riblet sculpture is present, curved in apertural direction. On the dorsal side the curvature is slightly stronger than on the ventral side. In the largest available specimen the number of such transverse riblets is 16 per cm on both sides, but they are more close-set in smaller shells. The ribs are most distinct on the central part of the shell, but they remain visible almost to the lateral margins. The transverse sculpture covers radial sculpture elements, which consist on the ventral side of a wide swelling in the centre, occupying c. two thirds of the entire shell width. On the dorsal side there likewise is a central rib, equalling c. half the shell width. This rib is delimited on each side by a shallow groove. In between this groove and the margins the shell surface first is slightly convex, becoming slightly concave close to the margins. The transitions between these lateral elements are gradual, so that one could also describe it as a wider central rib flanked on each side by a narrower one. In a single specimen it can be observed that the lateral margins are biangulate in transverse section.

Derivatio nominis. — From *L. collis*, m – hill, *collinus*, *collina* adj. – from the hills. The species is named after the area of its origin: the Turin Hills.

Discussion. — *Clio lavayssei* Rutsch, 1934, from the Miocene (Langhian, judging from the accompanying pteropod species) of Trinidad, differs from the present species by its narrow longitudinal rib, separated by two significant grooves, in the centre of the dorsal side. On both sides of this central rib there is a much weaker rib, vaguely delimited and gradually fading into a slightly concave area along the carinae. The dorsoventral diameter of *C. lavayssei* (fig. 2b), as reconstructed from the holotype, is c. one fourth of the shell width, and thus clearly less than in *C. collina*. Although Rutsch described the ventral side of *C. lavayssei* as regularly convex, with poorly marked transitions between the central and the lateral parts, the rib on the ventral side was found to be quite clearly separated and c. twice as wide as the central dorsal rib, as is in fact also visible in Rutsch's illustration.

Clio pedemontana (Mayer, 1868) differs clearly from *C. collina* by the absence of radial sculpture elements, and by a considerably smaller dorso-ventral diameter of the shell.

In the Paratethys realm there are several records from Egerian strata of species of *Clio* with longitudinal and transverse ornament. Published finds are *Clio* sp. 1 (Zorn, 1991) from the Linz area (Austria) and "*Balantium pedemontanum*" and "*Balantium fallauxi*" (in Hagn, 1961) from the Traunstein area in Bavaria (Germany). This material, housed in the Museum of Natural History (Vienna) and in the "Staatssammlung für Paläontologie und



Figs. 1-2. *Clio* (*Balantium*) spec. 1a-d, *C. (B.) collina* spec. nov., holotype. Colli Torinesi (? Termo-fourà), Italy, Piemonte; Miocene, ? Burdigalian/Early Langhian (Termò-Fòrà "Conglomerati" ?). Dipartimento di Scienze della Terra (Bellardi & Sacco collection), no. BS 007.05.001. a, dorsal view; b, left lateral view; c, ventral view; d, schematic transverse section at aperture. 2a-b, *C. (B.) lavayssei* Rutsch, 1934, holotype. Basin Hill Reserve, Central Range, Trinidad; Miocene, Ste Croix Beds. Naturhistorisches Museum, Basel, no. H 11358. a, external mould of ventral side, with part of internal mould in place, showing dorsal side, lower left part of specimen missing; b, schematic transverse section at aperture. Scale bars, 1 mm.

historische Geologie" (München), is of Late Egerian age. Most of the specimens are crushed and poorly preserved. In addition, we have material of *Clio*, as yet unpublished, from the "Älterer Schlier" (Early Egerian) of the Strengberg area in Upper Austria. All these specimens show flexuous transverse riblets, but only on the better-preserved ones are three longitudinal ribs visible.

In comparison to *Clio collina* and *C. lavayssei* the Paratethys specimens from Bavaria and Strengberg more closely resemble the latter species, on account of the presence of a narrow longitudinal rib in the middle of the dorsal side. The material from Strengberg differs from *C. lavayssei* in displaying a median rib on the ventral side which covers one third of the shell width and is subdivided into two ribs on the upper two thirds of the shell. Shell margins are straight. The best-preserved specimen from Bavaria has curved margins and shows secondary riblets on top of the transverse ribs. Secondary riblets are not known in *C. lavayssei*. Another specimen has a wider median rib and thus is similar to *Clio* sp. 1 from the Linz area. The latter may be differentiated from *Clio collina* only in its narrower median rib. Since most of these occurrences involve only few specimens and the range of variation is not fully known, a more precise differentiation is not yet possible.

Clio ichishiensis (Shibata, 1983), from the 'late Early Miocene' of Japan, in ornamentation resembles *C. lavayssei*, but its dorso-ventral diameter is considerably larger, almost

equalling the shell width. Furthermore, the transverse sculpture in the Japanese species is less strongly curved in apertural direction.

Clio nielsenii A.W. Janssen, 1990, from the Oligocene (Chattian) of Mogenstrup (Denmark) has a wider apical angle (c. 32°), the three longitudinal ribs on the dorsal side are more prominent and of about equal width, the central rib on the ventral side is significantly narrower and the transverse ornament is denser (c. 25 riblets per cm).

The type locality of *Clio collina* is only vaguely known. Therefore it is also difficult to give an age assignment for this species. Something, however, can be concluded by means of some associated species. Specimens of *C. collina* have been found together with *Gamopleura taurinensis* (Michelotti, 1847) and *Vaginella depressa* (Daudin, 1800), both indicating an Aquitanian/Burdigalian age, on the one hand, and with *Clio saccoi* Checchia-Rispoli, 1921, and *Vaginella austriaca* Kittl, 1886, indicating a Late Burdigalian-Langhian age, on the other. So, for the time being, it seems safe to assume that *Clio collina* is of Burdigalian age, keeping in mind that it might already occur during the Aquitanian, and possibly ranges into the Langhian.

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