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A NEW SPECIES OF *CYLLENE (CYLLENINA)* (MOLLUSCA, MESOGASTROPODA) FROM THE ARENAS DE HUELVA FORMATION (PLIOCENE, SOUTHERN SPAIN)

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A new species of the nassariid subgenus *Cyllene (Cyllenina)* Bellardi, 1882, is described from the Arenas de Huelva Formation (Pliocene, Zanclean) of Santa Catalina, near the village of Lucena del Puerto in southern Spain and from coeval strata at Velerin (Antena), Estepona, near Malaga. It is the first record of the genus from these units. The occurrence of other Nassariidae in the Lucena fauna is commented upon.

Key words — Zanclean, Pliocene, Spain, Mollusca, Nassariidae, new species.

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INTRODUCTION

Although the occurrence of Pliocene marine fossil molluscs from southwest Spain has been documented for over a century, taxonomic work on the rich and well-preserved fauna did not start until the early 1980s.

Since then numerous papers have been published by the University of Salamanca covering the systematics and taxonomy of the commoner species found in these deposits (Andrès, 1983, 1985, 1987, 1989; González Delgado, 1985, 1986, 1988, 1989, 1993). Unfortunately, material outside the Salamanca collections has not been consulted and the more problematic or endemic species have been ignored. Indeed, apart from the six new species described by one of us (Landau, 1984), just a single new taxon of *Caecum* has been described during the last twenty-four years (de Porta *et al.*, 1993).

The paper published by the Salamanca team covering the Nassariidae (González Delgado, 1989) does not mention the following species of the family, present in the authors' private collections: *Nassarius bollenensis* (Tournouër, 1874), *N. tersus* (Bellardi, 1882), *N. tumidus* (von Eichwald, 1830), *N. bonellii* (Sismonda, 1847) and *Cyclope neritea* (Linné, 1758). There are also a number of smaller nassariids, which are probably endemic and undescribed, the most interesting of which is *Cyllene (Cyllenina) lucenensis* sp. nov., described herein.

Strata exposed in the Santa Catalina outcrops are of Zanclean (Early Pliocene) age. The new species is restricted to the 'grey sands' in localities 4 and 5 of Landau (1984). In that paper, Landau commented on the distinction between these fine grey sands, which only appear in boreholes in the vicinity of Santa Catalina and the coarser 'yellow sands' from Bonares and Lucena del Puerto, named the Arenas de Huelva Formation by Civis et al. (1987). *Cyllene (C.) lucenensis* is also known from the conglomerates of Velerin (Antena), Estepona (near Malaga, Spain).

The Santa Catalina environment was infralittoral with warmer waters than those existing around the southwestern

coast of Spain today (Andrès, 1986). The 'grey sands' have not been worked on since and their correlation to the Arenas de Huelva Formation is unclear, although they probably represent a slightly different depositional environment, possibly at somewhat greater depth.

SYSTEMATIC PALAEONTOLOGY

Abbreviations — To denote the repositories of specimens referred to in the text the following abbreviations are used: IRScNB - Institut royal des Sciences naturelles de Belgique, Brussels (IST = Invertébrés du Secondaire et Tertiaire), UB - J. Martinell Collection, University of Barcelona, Department of Stratigraphy and Palaeontology, Faculty of Geology).

Superfamily	Buccinacea Rafinesque, 1815
Family	Nassariidae Iredale, 1916
Subfamily	Nassariinae Iredale, 1916
Genus	*Cyllene* Gray *in* Griffiths & Pidgeon, 1834
Subgenus	*Cyllenina* Bellardi, 1882

Type species — *Buccinum ancillariaeformis* de Grateloup, 1834, by subsquent designation of Peyrot (1925).

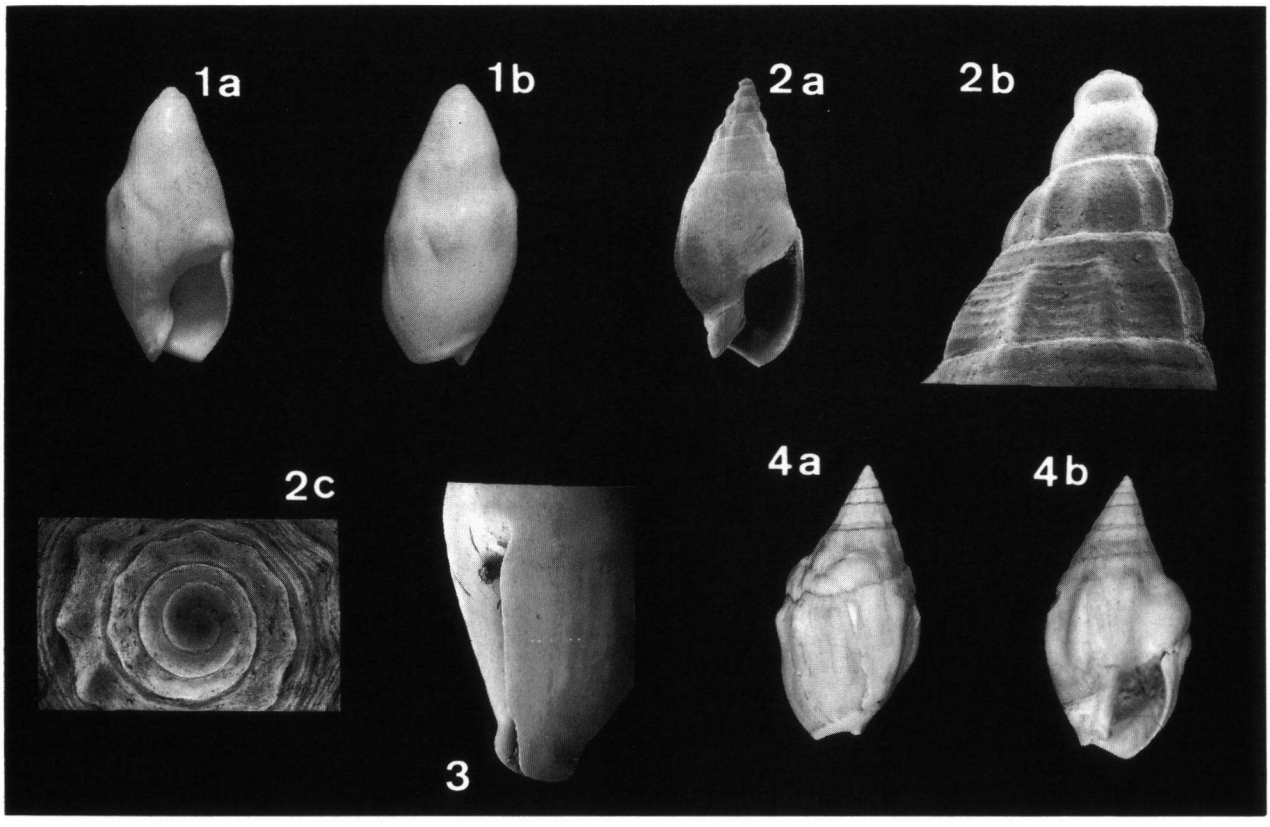

Fig. 1. Representatives of *Cyllene (Cyllenina)*: **1-3** are *C. (C.) lucenensis* sp. nov., Santa Catalina, locality 4 of Landau (1984), near Lucena del Puerto, Huelva, Spain; Arenas de Huelva Formation (Zanclean, Early Pliocene), 1 - IRScNB IST 6386 (holotype), x 2; 2 - IRScNB IST 6387 (paratype), a - protoconch, x 25; b, x 2; c - protoconch, adapical view, x 28; 3 - IRScNB IST 6388 (paratype), lateral view of apertural lip, x 6; **4** is *C. (C.) ancillariaeformis* (de Grateloup, 1834), IRScNB IST 6389, Montegibbio, near Modena (northern Italy); Late Miocene (Tortonian), x 2.5.

Cyllene (Cyllenina) lucenensis sp. nov.
Fig. 1/1-3

Derivatio nominis — Named after the village of Lucena del Puerto.
Locus typicus — Locality 4 (Landau 1984), Santa Catalina, near Lucena del Puerto (Huelva, southern Spain).
Stratum typicum — Arenas de Huelva Formation (Zanclean, Early Pliocene).
Material studied — Holotype is IRScNB IST 6386, paratypes are IRScNB IST 6387-IST 6388, and UB 01135-01136, from the type locality; 30 additional specimens in the B.M. Landau Collection from the type locality and from Santa Catalina Locality 5 of Landau (1984); 5 specimens in

the R. Marquet Collection from the type locality; and 98 specimens from Velerin (Antena), Estepona (near Malaga) in the B.M. Landau Collection, from Zanclean deposits (no formation name available yet).

Diagnosis — A small to medium-sized *Cyllene (Cyllenina)* characterised by the presence of thick callus completely covering the body whorl and spire, obscuring all surface ornament except for elongated nodules on the periphery of the body whorl.

Generic and subgeneric attribution — The new species undoubtedly belongs to the subgenus *Cyllenina* Bellardi 1882, which is distinguished from *Cyllene* (*s. str.*) in having a thickened parietal pad below the suture. In some specimens this thick parietal callus pad is more developed expanding over the upper part of the outer lip and extending up to the apex. This feature is more developed in the new species than in any other member of the subgenus. Thiele (1931) mentioned as shell characters of the genus *Cyllene* the protoconch with three whorls, teeth on the inside of the outer apertural lip and a columella with several plicae. The number of protoconch whorls should, however, only be used in defining species and not genera. *Cyllene (C.) lucenensis* lacks the apertural teeth and columellar plicae, but these characters vary strongly among Nassariidae.

Description — Shell small to medium sized, glandiform, adult height ranging from 9.5 to 20.7 mm, maximum diameter 9.0 mm. Juvenile shells ranging in size between 7 and 9 mm have a convex spire with distinct sutures and a barrel-shaped body whorl. The protoconch, composed of two and a half, tumid whorls with a deep suture, is high spired and smooth. Protoconch and teleoconch are not clearly delimited. The teleoconch starts with the appearance of axial ornament, while the shell becomes less smooth. The first teleoconch whorl is concave with about twelve strong axial ribs. The second is flat with the upper part of the axial ribs becoming obsolete. The third teleoconch whorl is concave with much weaker ribs, which all but disappear on the body whorl. Spiral ornament is also present in the juvenile forms, appearing on the second teleoconch whorl as irregularly spaced spiral grooves on the spire and stronger serrated spiral grooves on the lower third of the body whorl. This spiral ornament disappears at about the third teleoconch whorl. The heavy callus, characteristic of the adult form, starts in the juveniles as a thickened parietal pad at the junction of the body whorl and outer lip. It is this feature which reveals the true identity of these strange juvenile shells. In adult shells, the teleoconch consists of at least four whorls, up to the protoconch covered by thick, smooth, polished callus. Sutures obsolete, marked in some specimens by a shallow step in the callus. Fine teleoconch ornament obscured; elongated, blunt axial nodules, arising below the suture of the body whorl, being the only sculptural feature discernible under the callus. Body whorl comprising three quarters of the total height. Aperture elliptical, siphonal canal short and wide, delineated on the columellar side by a single strong recurved plait. Columella concave. Parietal callus heavy at juncture of body whorl and outer lip forming a distinct anal groove. Outer lip thin, slightly flared below, smooth within.

Remarks — The present species is not uncommon in the 'grey sands' at Santa Catalina. Some adult shells are more globular with a more strongly developed callus, but constant in other shell characteristics. It also occurs commonly in the conglomerates of Velerin (Antena), Estepona, near Malaga; these specimens tend to be slightly larger than those from the type locality. With its extensive callus formation, the species could form a parallel evolution to species of the olivid genus *Baryspira* P. Fischer, 1883.

The thickness and extent of callus formation in this new species immediately distinguish it from congeners. *Cyllene (Cyllenina) irregularis* (Bellardi, 1882), *C. (C.) sismondae* (Bellardi, 1882) and *C. (C.) subumbilicata* (Bellardi, 1882) from the Italian Pliocene, figured by Cavallo & Repetto (1992) all have axial ribs and the same general shape as the new Spanish species, but are not covered by callus. Another Italian Pliocene species, *C. (C.) paulucciana* (d'Ancona, 1864), which has also been recorded from the Iberian Pliocene near Malaga (Vera-Peláez *et al.*, 1995), has a quite different shell, elongated and almost smooth, with no axial ribs.

Cyllene (Cyllenina) ancillariaeformis (de Grateloup, 1834) (Fig. 1/4) found in the Late Miocene (Tortonian) of Italy (Bellardi, 1882), the Badenian of Hungaria (Strausz, 1966) and the Helvetian of the Aquitaine Basin (France; Peyrot, 1927) is closest to the new Spanish species, having axial ribs with a blunt knob below the suture and a well-developed parietal pad. This parietal callus in the Miocene species does not, however, extend over the body whorl and envelop the shell to any significant degree, as in the new species.

The genus *Cyllene* is widespread in the Neogene European faunas, occurring in the Neogene of the Paratethys, the Mediterranean and the Aquitaine Basin (France). Fifteen extant species have been recorded from West Africa to Japan. The species occurring closest to Spain is *Cyllene (Cyllene) lyrata* (Lamarck, 1806), which, according to Nicklès (1950), is found from Cabo Blanco to the Democratic Republic of Congo.

The subgenus *Cyllenina* is extinct. It was recorded by Peyrot (1927) from the Early to Middle Miocene of SW France, comprising seven taxa, some of which, however, belong to *Dorsanum* Gray, 1847, on account of their elongated, high-spired shell shape. Six species occurred according to Bellardi (1882) and Ferrero Mortara *et al.* (1981) in the Italian Miocene, five in Pliocene strata. Two of these could belong to *Dorsanum*. At least two species were present in the Paratethys Miocene, according to Hörnes & Auinger (1882) and Strausz (1966). The wide distribution of the subgenus during the Miocene strongly diminished during the Pliocene. No Pleistocene records are known.

Cyllene is another genus which may be added to the list of thermophilic taxa such as the gastropods *Solatia piscatoria* (Gmelin, 1790), *Tribia unangulata* (Deshayes,

1830) and representatives of the genera *Terebra* Bruguière, 1792 and *Conus* Linné, 1758, present off the European Pliocene coasts and now restricted to more southerly, warmer waters.

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