

Taxonomy and systematics

A new species of *Lysinoe* (Gastropoda: Helicoidea) from the Oligocene of Mexico

Una especie nueva de Lysinoe (Gastropoda: Helicoidea) del Oligoceno de México

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Received: 27 November 2023; accepted: 23 May 2024

<http://zoobank.org/urn:lsid:zoobank.org:pub:6F009397-AD47-4995-8790-223A97819748>

Abstract

In her 1945 study on the Tertiary fossil mollusks of northeastern Mexico, Gardner listed only 2 taxa of land snails: *Holospira eva* Gardner, 1945 and “*Helix*” sp. The latter is recognized here as a new species of *Lysinoe* Adams & Adams, 1855 (Helicoidea, Xanthonychidae). The new species can be diagnosed from its congeners by its flattened shell profile, a lower body whorl with a faint angulation on its median portion, a ridge-like angulation around the umbilicus, and a likely wide umbilicus. The species is known to occur in 2 nearby Upper Middle Oligocene outcrops in the eastern part of the state of Nuevo León.

Keywords: Mollusca; Land snail; Fossil; Nuevo León; Stylommatophora; Xanthonychidae

Resumen

En su estudio de 1945 sobre los moluscos fósiles del Terciario del noreste de México, Gardner enumeró solo 2 taxones de caracoles terrestres: *Holospira eva* Gardner, 1945 y “*Helix*” sp. Esta última se reconoce aquí como una especie nueva de *Lysinoe* Adams et Adams, 1855 (Helicoidea, Xanthonychidae). La nueva especie se puede diagnosticar a partir de sus congéneres por el perfil aplanado de su concha, la vuelta del cuerpo es más baja y con una leve angulación en su porción media, una angulación en forma de cresta alrededor del ombligo y un ombligo probablemente ancho. La especie se encuentra en 2 afloramientos cercanos del Oligoceno Medio Superior en la parte oriental del estado de Nuevo León.

Palabras clave: Mollusca; Caracol terrestre; Fósil; Nuevo León; Stylommatophora; Xanthonychidae

Introduction

In 1945, Julia Gardner published an important paper describing the Tertiary fossil molluscan fauna of northeastern Mexico (Gardner, 1945), with information and specimens collected by the United States Geological Survey (USGS). Virtually all fossils were marine or freshwater, with 2 exceptions: the land snail taxa *Holospira eva* Gardner, 1945 (Urocoptidae) and “*Helix*” sp.

Gardner (1945) assigned the fossils the broad identity of “*Helix*” sp. to signify they were helicoid snails (superfamily Helicoidea). Still, she alluded to the possibility that those fossils were closely related to the Mexican and Central American genus *Lysinoe* Adams & Adams, 1855 (Helicoidea, Helminthoglyptidae). Later, Roth (1984) described a new species, *Lysinoe breedlovei* Roth, 1984, from the Vieja Group (Upper Eocene; Texas, USA) and included Gardner’s “*Helix*” sp. in that species. It is uncertain why Roth (1984) did that, as the morphological differences between his new species and Gardner’s “*Helix*” sp. are quite striking. Furthermore, the discrepancy in age between the 2, alongside the large geographical distance, would also have been good indicators that they were 2 separate species.

Herein, Gardner’s “*Helix*” sp. is recognized as a distinct species belonging to the genus *Lysinoe* and described as new.

Materials and methods

The single specimen representative of the new species is housed in the Paleobiology Collection of the National Museum of Natural History (NMNH, Smithsonian Institution, Washington D.C., USA) under the registration number USNM MO 497132. A historical background and further details regarding the USGS collection efforts in Mexico can be found in Gardner (1945).

Description

Family Xanthonychidae Strebel & Pfeffer, 1880

Genus *Lysinoe* Adams & Adams, 1855 (type species *Helix ghiesbreghtii* Nyst, 1841)

Lysinoe bravoensis sp. nov. (Fig. 1)

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Shell large (height 23.0 mm, width 41.3 mm), helicoid, of ca. 4 whorls, with a low spire. Whorls growing regularly in size, but final ½ whorl suddenly expands towards aperture. Body whorl slightly flattened, with faint angulation on its median portion and light ridge-like angulation around the umbilicus. Aperture seemingly rounded, prosocline. Umbilicus seemingly deep and

relatively wide. The fossil is an internal mold, so not all shell structures can be observed; features such as the umbilicus’ width might be misleading.

Even though Gardner (1945: 18, 267) alludes to further material, no specimens beyond the holotype (Gardner’s figured specimens) were available for study at the NMNH. According to that author’s remarks, a few additional morphological features could be gleaned from the specimens then available (Gardner, 1945: 267): the number of whorls could grow a little beyond 4; shell moderately heavy (observed in fragments of shell adhered to some of the molds); the body whorl angulation in juvenile shells was more pronounced than in the adults.

Taxonomic summary

Type locality: Mexico, Nuevo León, General Bravo, USGS station 13517: “[a]nd just west of Rancho Paulino Ríos” (Gardner, 1945: 23, quadrant N-15 on map).

Type material: USNM MO 497132 (holotype).

Etymology: the specific epithet refers to the type locality.

Type stratum: base of Upper Middle Oligocene sandstone, described as a “hard conglomeratic, shaly, locally silicious sandstone” (Gardner, 1945: 18).

Age: Middle Oligocene.

Distribution: also known from nearby USGS station 14023: Nuevo León, General Bravo, Zacate, “[o]n a high hill 3,750 meters S. 68° W. from Zacate well No. 1” (Gardner, 1945: 32, quadrant N-13 on map).

Diagnosis: Shell large, helicoid with a flattened profile. Body whorl low, with faint median angulation. Ridge-like angulation around umbilicus. Umbilicus likely wide.

Previous mentions in the literature: “*Helix*” sp.: Gardner, 1945: 267, pl. 18, figs. 1-3. *Helix s. l.* near *Lysinoe* sp.: Gardner, 1945: 18. *Lysinoe breedlovei* [in part]: Roth, 1984: 203.

Remarks

Roth (1984, 1988) included *Lysinoe* and related forms in Helminthoglyptidae (Sei et al., 2017), while current classification (MolluscaBase, 2023; Thompson, 2011) places it in Xanthonychidae instead. That interpretation of Xanthonychidae was shown to be polyphyletic, with branches scattered throughout Helicoidea (Calcutt et al., 2020; Cuzzo, 1998; Zhang et al., 2024). The classification of *Lysinoe* in Xanthonychidae is maintained here, but it is noted that this could potentially change with new phylogenetic studies.

Considering the overall shell shape, the present fossil is consistent with helminthoglyptid snails, in particular with *Lysinoe* spp., which include animals with large helicoid shells with similar features, including the wide umbilicus



Figure 1. *Lysinoe bravoensis* sp. nov., holotype USNM MO 497132. A, Apertural view; B, lateral view; C, apical view; D, umbilical view. Scale bar = 2 cm.

and the periumbilical angulation (Schileyko, 2004; Zilch, 1960). Species in related genera, e.g., *Leptarionta* Fischer & Crosse, 1872 and *Helminthoglypta* Ancey, 1887, have smaller shells (Schileyko, 2004; Zilch, 1960). The shells of *Helminthoglypta* spp. are also much more globular. *Leptarionta* spp. often display a median angulation on the body whorl, but the shells typically have higher spires and a more conical profile.

The holotype and only specimen available is an internal mold of the shell, so interpretations of the species systematics must be done with caution. While the classification in *Lysinoe* seems the best solution at the moment, it must remain tentative until better-preserved fossils are found. There are minor morphological differences observed in the fossil (more flattened shell, light median angulation of body whorl; Fig. 1) that are not seen in recent representatives

of *Lysinoe*: *L. eximia* (Pfeiffer, 1844), *L. ghiesbreghti* (Nyst, 1841), *L. sebastiana* (Dall, 1897), and *L. starretti* Thompson, 1963. Those differences, alongside the old age of the fossil, could indicate that this species belongs to a still unrecognized and extinct genus. Nevertheless, only the discovery of additional material (both, of the new species and *L. breedlovei*), in a better state of preservation, can shed more light on this matter.

Therefore, the same shell features mentioned above (i.e., more flattened shell, light median angulation of body whorl) can be used to diagnose *Lysinoe bravoensis* sp. nov. from its extant congeners. Importantly, the more flattened shell, lower spire, the median angulation on the body whorl, the ridge-like angulation surrounding the umbilicus, and the larger umbilicus (Fig. 1) diagnose *Lysinoe bravoensis* sp. nov. from Roth's *Lysinoe breedlovei*.

Discussion

Living *Lysinoe* spp. are distributed from central and southern Mexico to El Salvador and Honduras (Schileyko, 2004; Thompson, 2011; Zilch, 1960). As such, an occurrence in the Oligocene of northern Mexico is outside the genus's current distribution but hardly surprising, particularly considering that *Lysinoe breedlovei* is from the Late Eocene of Texas, close to the border with Mexico (Roth, 1984).

Still, *Lysinoe bravoensis* sp. nov. represents the first fossil record of the genus in Mexico. The oldest record of the genus (and of other closely-related xanthonychid genera) is *Lysinoe breedlovei*. The superfamily Helicoidea, to which they belong, originated in North America, with its oldest records (family Labyrinthidae) dating from the Paleocene and Eocene (Calcutt et al., 2020; Roth, 1988).

Gardner (1945: 18) noted that in USGS station 14023, *Lysinoe bravoensis* sp. nov. was part of an assemblage with marine mollusks (both gastropods and bivalves) and the freshwater snail *Hemisinus miralejas* Gardner, 1945. Thus, Gardner (1945) suggested an estuarine paleoenvironment for the area, such as the mouth of a stream where sea shells could have accumulated alongside freshwater and terrestrial snail shells. Further, fossil *Hemisinus* spp. are also common in other deltaic deposits of northeastern Mexico (e.g., Vega & Perrilliat, 1992), supporting Gardner's (1945) interpretation. At the type locality USGS station 13517, no accompanying fauna was found (Gardner, 1945); however, considering the sedimentological similarity between the 2 stations (Gardner, 1945), a similar paleoenvironment could be expected.

An actualistic genus-level approach can be used to hypothesize further paleoenvironmental aspects (Rasser et al., 2019), though this must be done with caution considering the relatively old age of the fossil and its uncertain generic affinities. Based on the current distribution and habitats of living *Lysinoe* spp., a humid forest environment would have been expected for the region in the past (cf. Roth, 1984), contrary to today's xeric shrublands of the Tamaulipan mezquital.

Acknowledgements

I am very grateful to Mark Florence and Jessica Nakano (NMNH) for the loan of the material; to Erik Kjellman and Andreas Altenburger (UiT) for the help with the photographs of the specimen; and to the two anonymous reviewers and the editor, Xochitl Vital, for their helpful comments.

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