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Alvania erentoezae – a new Rissoid gastropod species from the Early Tortonian of the Antalya Basin (Western Taurids, SW Turkey)

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(With 2 text-figures and 1 plate)

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Summary

The Miocene of the Antalya basin is represented mostly by coarse and fine detritic and partly carbonate deposits in the Western Taurids, SW Turkey. One new gastropod species belonging to the Rissoidae family is described from pelites of the Kargı section comprising Early Tortonian deposits of the Aksu formation. *Alvania erentoezae* nov. sp. is slender shaped, the teleoconch is narrow, the aperture is completely round, thickened by a varix, its last whorl makes 50 % of the total shell. On the other hand, *Alvania erentoezae* nov. sp. has pauicispiral protoconch which indicates direct development with a very slight angulation, fine spiral threads on the abapical part of the whorland.

Key words: Gastropoda, Rissoidae, *Alvania,* Late Miocene, Tortonian, Mediterranean, Antalya basin, Turkey

Zusammenfassung

Miozäne ablagerungen des Antalya Beckens (W-Tauriden, Türkei) sind vorwiegend durch grobe bis feine siliziklastika und untergeordnet durch karbonate vertreten. Eine neue rissoidae Gastropodenart wird aus den bei Kargi aufgeschlossenen untertortonen peliten der Aksu Formation beschrieben. *Alvania erentoezae* nov. sp. ist eine schlanke form mit runder apertur und kräftiger varix. Der letzte umgang macht 50 % der gesamten schalenhöhe aus. Der paucispirale Protoconch ist Hinweis auf direkte Entwicklung und zeigt eine schwache Angulation und feine Spiralen im abapikalen Bereich der Windung.

Schlüsselwörter: Gastopoden, Rissoidae, *Alvania,* Spätes Miozän, Tortonian, Mediterranean, Antalya Becken, Turkei

Introduction

The Antalya Basin is located in the southwestern part of Turkey within the Antalya-Isparta- Alanya provinces (Fig. 1). It overlies the Precambrian – Early Cainozoic basement rocks having autochthonous or allochthonous units. The autochthonous rock units are Beydagları and Anamas- Akseki autochthones, whereas the allochthonous units are the Antalya, Alanya, Beysehir-Hoyran-Hadim nappes (BRUNN et al. 1971; DUMONT & KEREY 1975a; MONOD 1977; POISSON 1977; AKBULUT 1977, 1980; WALDRON 1982; AKAY et al. 1985; ŞENEL et al. 1996; ŞENEL 1997a, b).

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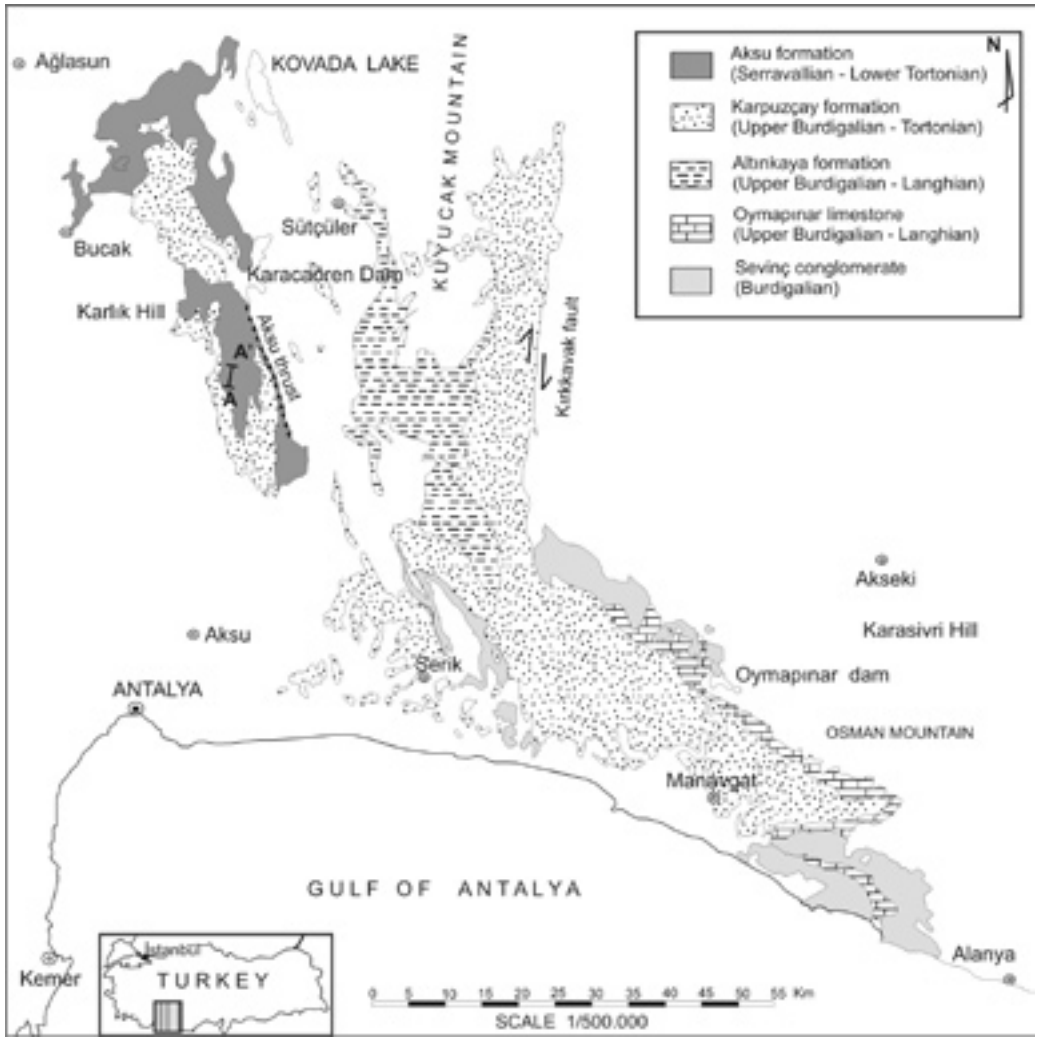

Fig. 1: Antalya Miocene basin. AA': Kargı measured section (adapted from İSLAMOĞLU 2001–2002).

The Miocene of the Antalya basin is represented mostly by coarse and fine detritic and partly carbonatic deposits. The main facies in the basin are alluvial–fan deltaic conglomerates sometimes yielding patch reefs and turbiditic detritics (BLUMENTHAL 1951; ŞENEL et al. 1996; FLECKER et al. 1995; ROBERTSON et al. 1996; KARABIYIKOĞLU et al. 1996, 2000).

Within the Miocene units, molluscan faunas were found only in the Oymapınar limestone, the Sevinç conglomerate, the Altınkaya formation and the Aksu formation (İSLAMOĞLU 2001–2002). Based on these faunas, the Miocene stratigraphy of the basin was re-evaluated (İSLAMOĞLU 2001–2002; İSLAMOĞLU & TANER 2004a, 2004b). According to this, the early Miocene Kepez travertine is the lowermost unit and lies unconformable on the

basement in the southeast of the basin. Upsection, the Burdigalian Sevinç conglomerate of alluvial fan/fan delta character overlies this unit. The Upper Burdigalian to Langhian Oymapınar limestone is composed of reefal and massive limestones and conformably overlies the Sevinç conglomerate. The Sevinç conglomerate and Oymapınar limestone are also unconformably overlying the basement rocks. The Oymapınar limestone is overlain by the Geceleme formation (Langhian) and the Upper Burdigalian to Tortonian Karpuzçay formation composed of turbiditic sediments. While the Geceleme formation is overlain by Serravalian-Tortonian units of the Karpuzçay formation along the eastern side of the basin, Upper Burdigalian-Langhian deposits of the Karpuzçay formation laterally pass into the Altınkaya formation in the central part and it is overlain by the Aksu formation at the west side of the basin. The Altınkaya formation is exposed in central and northern parts of the basin (İSLAMOĞLU 2001–2002). It is characterized by brackish water and marine settings and contains Upper Burdigalian to Langhian mollusc faunas. It unconformably overlies the basement rock units and is overlain by the Aksu formation. Laterally, the Altınkaya formation is also transitional with Upper Burdigalian to Langhian parts of the Karpuzçay formation. The Aksu formation crops out widely at western and central parts of the Miocene Antalya basin. Molluscan faunas are confined to its Early Tortonian parts. Based on the thick terrestrial sediments underlying the marine sediments, the overall age-estimation of the formation is accepted as Serravallian – Tortonian (İSLAMOĞLU 2001–2002).

The other units in the studied area are the Early Pliocene Gebiz, Eskiköy and Yenimahalle formations, the Upper Pliocene Alakilise formation, the Pleistocene Belkıs conglomerate and the Quaternary Antalya travertine and alluvions (POISSON 1977; AKAY et al. 1985).

A compressional/extensional type of tectonic regime prevailed during the Miocene in the region. The products of the compressional regime are the emplacement of Lycian nappes from northwest to southeast, NE-SW trending Aksu thrust and Kırkkavak fault which is a right – lateral strikeslip fault with reverse slip component (DUMONT & KEREY 1975b; POISSON 1977; AKAY & UYSAL 1988). This active tectonic regime especially affected the central, western and northern part of the basin and caused rapid change in environmental conditions (ÖZER et al. 1974; AKAY et al. 1985; ŞENEL et al. 1996; FLECKER et al. 1995; ROBERTSON et al. 1996; KARABIYIKOĞLU et al. 1996; 2000). Therefore, a restricted fauna was developed in the short stable periods. Generally, the reefal fauna consisting mainly of corals and coralline algae in the patch reefs (ÖZER et al. 1974; AKAY et al 1985; AKAY & UYSAL 1988; ŞENEL et al. 1996; TUZCU et al. 1994; FLECKER et al. 1995; KARABIYIKOĞLU et al. 1996, 2000; ATABEY 1998) and molluscs in the lagoons and shallow marine environments was found in central, northern and eastern parts of the basin (İSLAMOĞLU 2001–2002, İSLAMOĞLU & TANER 2003, 2004a, b).

In terms of biogeography, the mollusc fauna was part of the Miocene Proto-Mediterranean-Atlantic region (HARZHAUSER et. al 2002), as documented by taxa such as *Cingula (Peringiella) ventricosella* CERULLI-IRELLI, 1914, *Terebralia subcorrugata* (d'ORBIGNY, 1852), *Cerithium appenninicum dertosulcata* SACCO, 1895, *Cerithium vulgatum miocenicum* VIGNAL, 1910, *Granulolabium (Tiaracerithium) pseudotiarella* (d'ORBIGNY, 1852), *Triphora adversa miocenica* COSSMANN & PEYROT, 1924, *Xenophora infundibulum* (BROCCHI, 1814).

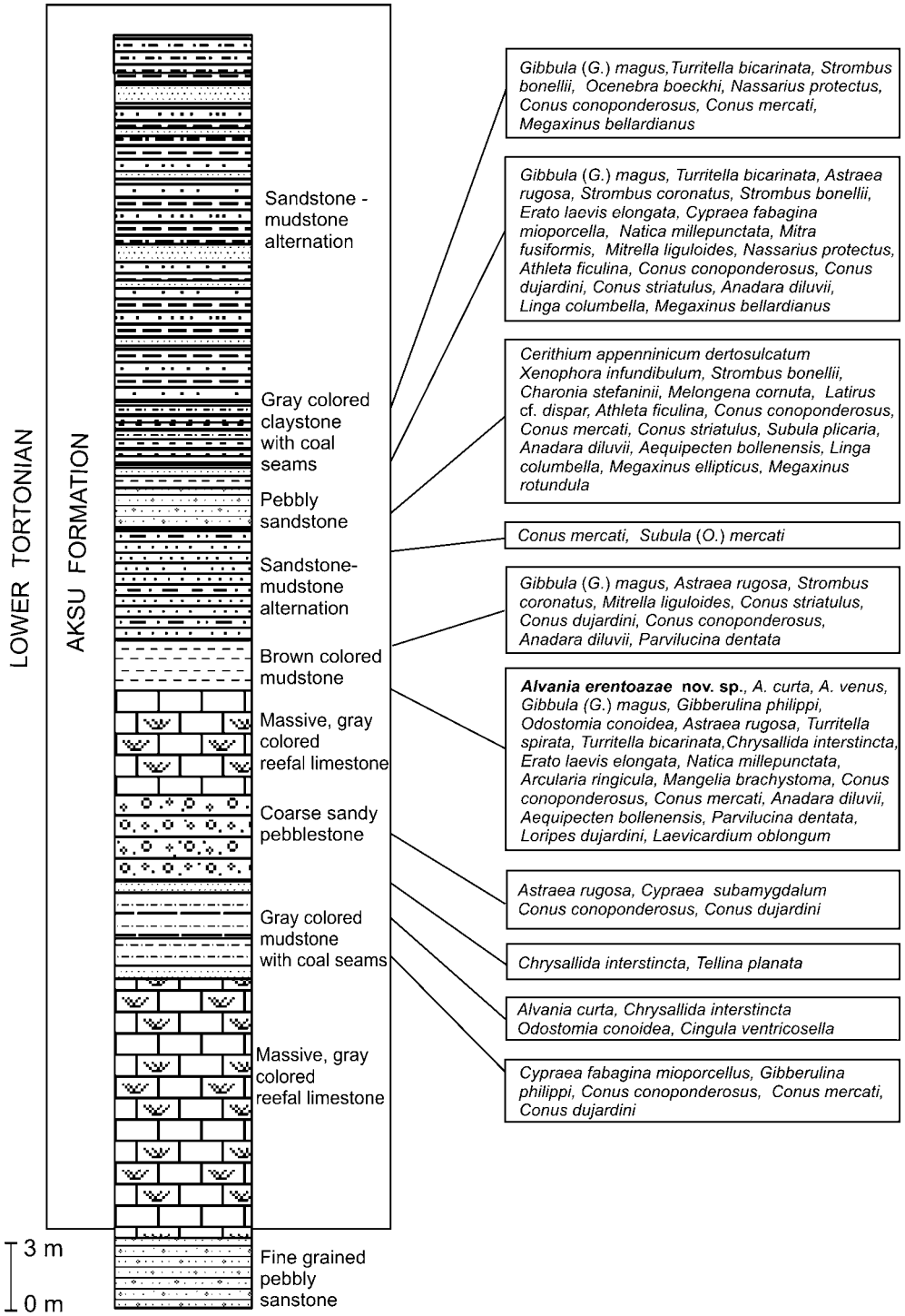

Fig. 2: Kargı section measured from Aksu formation (simplified from İSLAMOĞLU 2001–2002).

In this study, *Alvania erentoezae* nov. sp. is found in the Early Tortonian of the Kargı section in the Aksu formation (Fig. 2). At the Kargı section, the Aksu formation starts with thick alternations of terrestrial conglomerate, sandstone and mudstone. No molluscs were detected in these sediments. Above this, an 11 m thick, massive, light grey coralgal reefal limestone follows (Fig. 2). After that, the grey mudstone with a rich mollusc fauna representing normal marine conditions is found [e.g.: *Cypraea fabagina* (LAMARCK, 1811), *Conus mercati* BROCCHI, 1814]. This unit is overlain by another level of reefal limestone. *Alvania erentoezae* nov. sp. is found in the brown colored mudstone overlying that reefal limestone. In this level, a rich mollusc fauna comprising species such as *Gibbula magus* (LINNEAUS, 1758), *Gibberulina philippi* (BUCQUOY, DAUTZENBERG & DOLLFUS, 1882), *Odostomia (Megastomia) conoidea* (BROCCHI, 1814), *Arcularia (Arcularia) ringicula* (BELLARDI, 1878) indicates an Early Tortonian age and normal marine conditions (İSLAMOĞLU 2001–2002, İSLAMOĞLU & TANER 2003, 2004a, b). The alternations of reefs and sandy mudstones with sublittoral marine mollusc fauna are interpreted as result of rapidly fluctuating environmental conditions during the Early Tortonian (İSLAMOĞLU 2001–2002, İSLAMOĞLU & TANER 2003, 2004a, b). A list of the entire molluscan fauna is given in Figure 2.

Material and Method

The investigated material was collected in the Early Tortonian levels of the Aksu formation. The specimens were extracted from pelitic samples after processing with H_2O_2 drying and screening through sieves. Shells were sputtered with gold and documented by using scanning electron microscopy.

In this study, the protoconch feature is accepted as a main distinctive factor. Besides this, the morphology and the height/width ratio (SH/SW) of the shells are used as factors for emphasizing the distinct character of that new species. Dimensions were measured after the SEM investigations and all figured specimens are deposited in the collection of the NHMW with the collection number 2005z0034/0001-0003 (Natural History Museum Vienna).

Systematic Paleontology

Class Gastropoda CUVIER, 1797

Subclass Caenogastropoda COX, 1959

Order Littorinimorpha GOLIKOV & STAROBOGATOV, 1975

Superfamily Rissooidea GRAY, 1847

Family Rissoidae GRAY, 1847

Subfamily Rissoinae GRAY, 1847

Genus: *Alvania* RISSO, 1826

Type species: *Turbo cimex* LINNEAUS, 1758 from the Mediterranean Sea and NE Atlantic (KOWALKE & HARZHAUSER 2004).

In the recent studies, *Alvania* is regarded as belonging to the Rissoinae subfamily, because of exhibiting similarities with the genus *Rissoa* concerning teleoconch sculpture, operculum, radular characters and protoconch sculptures (KOWALKE & HARZHAUSER 2004). Generally, *Alvania* develops very small, egg shaped and reticulate sculptured shells with rounded whorls and sometimes thickened varix at the aperture (WENZ 1938). In addition, the protoconch morphology and sculpture exhibit a coarser larval sculpture with occasionally occurring zigzag-shaped spiral striae (KOWALKE & HARZHAUSER 2004). Therefore, the new species is included within *Alvania*.

***Alvania erentoezae* nov. sp.**
(Plate 1, Fig. 1–3)

H o l o t y p e : NHMW 2005z0034/0001.

L o c u s t y p i c u s et s t r a t u m t y p i c u m : 12 km south of Kargı, Aksu formation in Antalya basin, Turkey (Isparta N25b4 X1: 06150 Y1: 27350), pelites within the Kargı section (meter 30 of Fig. 2).

D e r i v a t i o n o m i n i s : This species is dedicated to Dr. Lütfiye ERÜNAL ERENTÖZ (Mineral Research and Exploration, retired) in memory and honour to her contributions to the Neogene Molluscan biostratigraphy in Turkey.

D e s c r i p t i o n : Small-sized, slender consisting of 5 convex whorls including the protoconch separated by a deep suture line. Spire narrow with an angle of 35°. Sculpture consisting of 11–12 axial ribs and 5–6 spirals; body-whorl rather narrow attaining about 50 % of the total shell height. Aperture small, rounded, with thick varix. The protoconch consisting of 1.5 rounded whorls is paucispiral, points to direct development, very slight angulation, fine spiral threads on the abapical part of the whorland.

M e a s u r e m e n t s : Shell height: 1.43–2 mm, shell width: 0.79–1.23 mm, last whorl height: 0.97 mm, aperture height: 0.60 mm, aperture width: 0.60 mm, varix width: 275 micron, protoconch height: 0.2–0.3 mm, protoconch width: 0.25–0.37 mm.

R e m a r k s : Mainly, *Alvania* species are divided into two catagories according to their protoconch features as having multispiral indirect development or not (LOZOUET 1998, KOWALKE & HARZHAUSER 2004). While the species with multispiral indirect development have a protoconch with a few whorls or more, the species showing direct developments have a very short protoconch (LOZOUET 1998). *Alvania erentoezae* nov. sp. has a short protoconch indicating direct larval development. In first view, it differs from the ones having multispiral protoconchs such as the Late Oligocene to Middle Miocene species *Alvania (Alvania) oceani* (d'ORBIGNY, 1852) (COSSMANN & PEYROT 1919: 587–588, pl. 16, fig. 11–112; KOWALKE & HARZHAUSER 2004: 120, fig. 7A) and the Miocene species *Alvania (Alvania) venus* (d'ORBIGNY, 1852) (COSSMANN & PEYROT 1919: 585–587, pl. 17, fig. 23–24). The protoconch of *Alvania erentoezae* nov. sp. with its 1.5 rounded whorls allows a separation from *Alvania oceani* which develops a protoconch consisting of 2.5 slightly rounded whorls with a slightly thickened, fractioned sinusigera notch. Similarly, *Alvania venus* displays a considerably longer protoconch with 2.75 whorls (KOWALKE & HARZHAUSER 2004). Among the other *Alvania* groups

having short protoconch which indicate non-planktotrophic development, *Alvania erentoezae* nov. sp. differs from the Late Oligocene and Early Miocene species *Alvania aturensis* LOZOUET, 1998 (LOZOUET 1998: 78, fig. 8 k-l; 11 a-b) and the Late Aquitanian species *Alvania andraldensis* LOZOUET, 1998 (LOZOUET 1998: 76, fig. 8 f-h) in its sculpture. The protoconch of *Alvania erentoezae* nov. sp. shows a very slight angulation and fine spiral threads on the abapical part of the whorland. The new species has compared to the original collection of type species of *Alvania aturensis* LOZOUET, 1998 and *Alvania andraldensis* LOZOUET, 1998 in NHMN of Paris. Thus, *Alvania andraldensis* LOZOUET, 1998 is very similar but differs by its ovoid shape and the fewer number of teleoconch whorls (3 canalicalulate whorls). But, the protoconch of *Alvania andraldensis* is carinate with spiral cords; the body whorl attains 64 % of total shell height. The protoconch of *Alvania aturensis* differs by its fine opistocryt striae. Apart from the protoconch features, the shell measurements and ratios of the similar *Alvania* species to new one is compared. Therefore, it is found that *Alvania erentoezae* nov. sp. has more elongate, slender shape and the rounded aperture and its last whorl makes 50% of the total shell. While SH/SW rates of *Alvania erentoezae* nov. sp. range around 1.94, this ratio is 1.96 for *Alvania andraldensis* LOZOUET, 1998, 1.77 for *Alvania (Alvania) venus* (d'ORBIGNY, 1852), 1.6 for *Alvania aturensis* LOZOUET, 1998 and 1.48 for *Alvania (Alvania) oceani* (d'ORBIGNY, 1852).

D i s t r i b u t i o n : Early Tortonian in the Antalya Miocene basin of SW Turkey.

Conclusion

One new gastropod species belonging to the family Rissoidae is described from the Miocene Antalya Basin. *Alvania erentoezae* nov. sp. is found in the early Tortonian Aksu formation at the Kargı section. It has short protoconch which indicates non-planktotrophic development. It differs from the other species having short protoconch by showing a very slight angulation and fine spiral threads on the abapical part of the whorland. Apart from this, while comparing to the shell measurements and ratios, the shape of it is slender, the teleoconch is narrow, the aperture is completely round with a thickened varix.

On the other hand, while the all Middle Miocene (Badenian) Central Paratethian *Alvania* species have long (multispiral) protoconch pointing to planktotrophic development (KOWALKE & HARZHAUSER 2004), a part of Oligocene – Early Miocene *Alvania* species (LOZOUET 1998) and the Late Miocene *Alvania erentoezae* nov. sp. have a short protoconch indicating direct development.

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Plate 1

Fig. 1–3: ***Alvania erentoezae*** **nov. sp.**
Scale bar: 0.5 mm

Fig. 1: height: 1.43 mm, width: 1.03 mm, protoconch height: 0.3 mm, protoconch width: 0.33 mm (Holotype: NHMW 2005z0034/0001)

Fig. 2: height: 2.0 mm, width: 1.23 mm, protoconch height: 0.24 mm, protoconch width: 0.37 mm (Paratype: NHMW 2005z0034/0002)

Fig. 3: shell height: 1.58 mm, shell width: 0.79 mm, protoconch height: 0.2 mm, protoconch width: 0.25 mm (Paratype: NHMW 2005z0034/0003)