

A new *Zonarina* (Mollusca: Gastropoda: Cypraeidae) from the middle Miocene (Badenian) of Hungary

Újabb *Zonarina* (csiga) faj
a magyarországi a középső-miocén (badeni) rétegekből

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(2 tábla)

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Tárgyszavak: Cypraeoidea, Cypraeidae, *Zonarina*, fosszília, Magyarország

Összefoglalás

A *Paratethys* középső-miocénjébe (badeni) tartozó, a magyarországi bándi lelőhelyen talált új *Zonarina* (Mollusca: Gastropoda: Cypraeidae) faj franciaországi, az „alsó-atlanti miocénből” leírt hasonló fajokkal, illetve a *Paratethys* ausztriai és bulgáriai badenijéből leírt, valamint a lengyelországi északi-tengeri medencében feltárt langhi emeletbeli lelőhelyek más fajaival együtt kerülnek leírásra és tárgyalásra. Erről a területről szép számmal ismertünk endemikus cypraeida fajokat is. SCHILDER (1923; 1925; 1932) ez utóbbi fajok közül többet is leírt.

A közelmúltban felfedezett újabb endemikus fajt *Zonarina liviae* nov. fajként írunk le.

Abstract

A new species of *Zonarina* from the Middle Miocene (Lower Badenian) of the Paratethys of Bánd, Hungary is described. Comparisons are made with similar species from the “lower Atlantic Miocene” of France, Badenian deposits of the Paratethys of Austria and Bulgaria, and from the Lower Middle Miocene (Langhian) of the Polish portion of the North Sea Basin.

Introduction

The mollusc fauna of the Middle Miocene of the Paratethys is unique. In general, endemism in the Paratethyan gastropod fauna is low compared to that of bivalves.

The composition of the gastropod fauna was often massively influenced by immigrants from the Mediterranean–Atlantic Region rather than by local evolution (MANDIĆ et al. 2002).

However, there are several endemic cypraeid species known from this region and they were described by SCHILDER (1923, 1925, 1932). Since then another endemic species has been discovered and it is described as *Zonarina liviae* nov. spec.

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Abbreviations

DFB – Dirk FEHSE Collection, Berlin, Germany

M – Geological Institute of Hungary. (H-1143, Budapest, Stefánia út 14.)

THH – Tamás HIRMETZ Collection, Fót, Hungary

ZVH – Zoltán VICIÁN Collection, Budapest, Hungary

ct – columellar teeth

lt – labral teeth

Superfamily Cypraeoidea RAFINESQUE, 1815

Family Cypraeidae RAFINESQUE, 1815

Genus Zonarina SACCO, 1894

Species type: *Zonarina pinguis longovulina* SACCO, 1894 by original designation.
Middle Miocene (Serravalian), northern Italy.

Zonarina liviae nov. spec.

Pl. 1, figs 1–3, pl. 2, figs 1–5.

1966 *Cypraea (Bernaya) fabagina* LAMK. – KÓKAY, A herend-márkói barnaköszénterület: 56, pl. 7, fig. 13, 14.

Holotype: Pl. 1, fig. 1a–d (M-2541)

Paratype 1: Pl. 1, fig. 2a–d (ZVH, No. 871)

Locality type: Bánd, county Veszprém, Hungary.

Stratum type: Lower Badenian, Middle Miocene.

Derivatio nominis: Named in honour of Lívia VICIÁNNÉ HARGITAI the wife of the second author.

Shell formula: [24 (73-53) 20:17].

We have used the shell formula proposed by SCHILDER (1935: 327). This formula is derived from measurements taken from all available fully mature and normally formed specimens. It consists of the following elements:

[L (W-H) LT: CT]. [#] denotes that the teeth are partly absent or not countable for some particular reason.

L: average length in mm,

W: average width/ length ratio in %,

H: average height/ length ratio in %,

LT: normalized number of labral teeth,

CT: normalized number of columellar teeth. The normalized number of teeth – in relation to a shell of 25 mm length – is calculated as follows: $T = 7 + [(c-7)*v / (25/L)]$

T: normalized number of teeth, c: teeth counted, L: length.

Description

The shell is medium-sized, and rather squat, and it is an inflated pyriform, with a produced, blunt anterior terminal and a short, curved and slightly indented posterior terminal. The terminals are slightly separated from the dorsal elevation

by a small indentation. The spire is rarely exvolute, and it is just above the bulge of the anal canal, being usually obsolete and covered by thick terminal callus, marked by a spiral sulcus. The dorsum is convex with the highest elevation at the posterior third and with the apex placed on the right side, with smooth margins and strongly thickened by callus. The marginal callosity forms a distinct and rounded keel on both sides. The ventrum is weakly convex. The aperture is sinuous, being curved posteriorly with parallel edges. It is relatively narrow, and is slightly wider at the fossular section. The labrum is thickened and expanded in the medial portion, and it is slightly decline at the anterior portion. The inner margin has a sharp edge with 19–22 somewhat coarse, close-set, regular labral denticles. The latter are extended as folds onto the ventrum. The parietal lip is weakly denticulate 14–20 well-developed denticles. These weaken with so that the denticles on the medial portion are only slightly visible. The denticles strengthen again slightly on the posterior third. The denticles do not extend as folds onto the columella but onto the fossula within the aperture. The terminal fold is marginal and borders the siphonal canal where it is weakly strengthened to form a narrow keel. The subsequent columellar teeth are followed by a slight interstice. The fossula are usually flattened, very steep and they are not clearly delimited from the rest of the columella, which has 3–6 irregular denticles on its inner edge. The anterior border is formed by the continuation of the terminal fold. Here the terminal fold is projected at the anterior corner of the fossula. The anterior margin of the fossula is free and it is not fused with the inside of the dorsum.

Some specimens show remnants of a small red-brown spire blotch and several show remnants of a red-brown fine dorsal mottled pattern, whereas the margins and the ventrum are white.

Variation

The curving of the posterior aperture varies considerably. In some specimens the anterior terminal is protruded. The ventral margin is sometimes very callused and gives the impression of a bump. The area of the dorsal mottled pattern is in some specimens very narrow.

Material and measurements

A total number of 8 specimens was examined in detail. These specimens were collected by the second author and Dr. Tamás HIRMETZL at Bánd village, Veszprém county, Hungary in 2002–2003 – Lower Badenian, Middle Miocene.

Holotype: L = 23.9 mm, W = 16.5 mm, D = 12.5 mm, ct 18, lt 20 (M-2541)

Paratype 1: L = 23.6 mm, W = 16.9 mm, D = 12.8 mm, ct 14, lt 19 (ZVH, coll. No. 871)

Paratype 2: L = 21.4 mm, W = 15.2 mm, D = 11.2 mm, ct 16, lt 21 (DFB, coll. No. 7373)

Paratype 3: L = 26.4 mm, W = 19.2 mm, D = 14.2 mm, ct 19, lt 21 (ZVH, coll. No. 826)

Paratype 4: L = 22.1 mm, W = 15.9 mm, D = 11.3 mm, ct 15, lt 19 (ZVH, coll. No. 600)

Paratype 5: L = 24.5 mm, W = 18.0 mm, D = 12.9 mm, ct 18, lt 19 (ZVH, coll. No. 598)

Paratype 6: L = 23.9 mm, W = 18.3 mm, D = 12.8 mm, ct 19, lt 19 (ZVH, coll. No. 597)

Paratype 7: L = 22.9 mm, W = 16.8 mm, D = 12.2 mm, ct 14, lt 19 (THH, coll. No. 912)

Discussion

Zonarina (subfamily Cypraeovulinae SCHILDER, 1925 [= *Erroneinae* SCHILDER, 1925]) are recognizable due to the following characteristics: callused margins, a flattened weakly-developed fossula, and a denticulated inner margin. The new species possess all these features and can thus be presumed to be attached to the genus.

Zonarina liviae nov. spec. is slightly similar to *Z. laterimata* SACCO, 1894 (Pl. 1., Fig. 4–5a, b, c, d) when only the shell outline, dorsal colour pattern, and the flattened and folded fossula are considered. However both species are immediately separable by the finer and more numerous dentition of *Z. laterimata* SACCO, 1894. Another similar species is *Z. dertamygdaloides* SACCO, 1894 (Pl. 1., Fig. 6a, b, c, d) but *Z. liviae* is separated by the more inflated columella, the less developed fossula, the labral denticles that are elongated as folds onto the labrum, and the anterior terminal with a small indentation. SCHILDER & SCHILDER (1971: 43) considered *Z. badenensis* SCHILDER, 1925 to be a subspecies of *Z. dertamygdaloides* SACCO, 1864 but *Z. badenensis* SCHILDER, 1925 does not look similar to the latter form. It has a more cylindrical shell with less callused margins, a smooth concave fossula, an inflated columella, a less elevated, almost flattened dorsum with the hump on the posterior third, and non-separated terminals. Based upon these differences we consider *Z. badensis* SCHILDER, 1925 to be a distinct species, which differs from *Z. liviae* due to the above-mentioned features. *Zonarina lanciai* (BRUSINA 1877) is also similar to *Z. liviae* in general shell outline. BALUK (1995: 186; compare also FEHSE 2001b) wrote that there are no grounds for separating *Z. brocchii* (DESHAYES, 1844) and *Z. lanciai* (BRUSINA, 1877). Unfortunately, he neither explained what unites both forms nor showed the shell types to confirm his decision. SCHILDER (SCHILDER & SCHILDER, 1971: 42, 43) split both forms and also has both species separated in his collection (FEHSE 2001a). *Z. brocchii* (DESHAYES 1844) is a damaged shell where more than 50% of the labrum is missing. However, the shell lacks the heavy marginal callosities seen in the specimens usually identified as *Z. brocchii* (DESHAYES 1844). The specimen identified by SCHILDER as *Z. lanciai* (BRUSINA 1877) in his collection originates from the Badenian of Nikolsburg, Czech Rep. and is 41.2 mm larger than the specimens usually identified as *Z. brocchii* (DESHAYE 1844). Furthermore, the fossula and the shell morphology in general seem to separate both taxa. *Zonarina lanciai* (BRUSINA 1877) differs from *Z. liviae* in having a concave fossula without ribbing and it has weak obscured denticles on the inner fossular edge. The highest point of the dorsal elevation is central,

it has less callused margins, and it lacks the keels on both sides. Furthermore, the labral denticles are not elongated as folds onto the labrum.

Zonarina austriaca SCHILDER, 1925 (Pl. 2., Fig. 6a, b, c, d) was described from the Badenian of Gainfarn, Austria. Later SCHILDER & SCHILDER (1971: 43) synonymized the species with *Z. dertamygdaloides* SACCO, 1894 without giving any comment on their decision. However, *Z. austriaca* SCHILDER, 1925 differs from the latter in having a concave, smooth fossula with the inner margin distinctly denticulated. The posterior end of the labrum is not so protruded and there is a large spire blotch that may also indicate differences in the colouration. *Z. liviae* differs from *Z. austriaca* SCHILDER, 1925 because of the the flattened fossula with folds on its surface and the dorsum is not so elevated and the separated anterior is terminal. The similar colouration, especially the spire, is blotchy and the keeled outer margins may indicate a common origin.

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Kézirat beérkezett:

Plate 1

- 1a, b, c, d *Zonarina liviae* nov. sp. Holotype, M-2541, $\times 1.3$, Lower Badenian, Middle Miocene, Bánd, county Veszprém, Hungary.
- 2a, b, c, d *Zonarina liviae* nov. sp. Paratype 1, coll. ZVH, No.871, $\times 1.3$, Lower Badenian, Middle Miocene, Bánd, county Veszprém, Hungary.
- 3a, b, c, d *Zonarina liviae* nov. sp. Paratype 2, coll. DFB, No. 7373, $\times 1.3$, Lower Badenian, Middle Miocene, Bánd, county Veszprém, Hungary.
- 4a, b, c, d *Zonarina laterimata* SACCO, 1894, coll. DFB, No. 5520a, $\times 1.3$, Aquitanian, Early Miocene, St. Martin d'Oney, Landes, France.
- 5a, b, c, d *Zonarina laterimata* SACCO, 1894, coll. DFB, No. 5520b $\times 1.3$, Aquitanian, Early Miocene, St. Martin d'Oney, Landes, France.
- 6a, b, c, d *Zonarina dertamygdaloides* SACCO, 1894, coll. DFB, No. 7365, $\times 1.3$, Badenian, Middle Miocene, Gainfarn, Austria.

Plate 2

- 1a, b, c, d *Zonarina liviae* nov. sp. Paratype 3, coll. ZVH, No. 826, $\times 1.3$, Lower Badenian, Middle Miocene, Bánd, county Veszprém, Hungary.
- 2a, b, c, d *Zonarina liviae* nov. sp. Paratype 4, coll. ZVH, No. 600, $\times 1.3$, Lower Badenian, Middle Miocene, Bánd, county Veszprém, Hungary.
- 3a, b, c, d *Zonarina liviae* nov. sp. Paratype 5, coll. ZVH, No. 598, $\times 1.3$, Lower Badenian, Middle Miocene, Bánd, near Veszprém, Hungary.
- 4a, b, c, d *Zonarina liviae* nov. sp. Paratype 6, coll. ZVH, No. 597, $\times 1.3$, Lower Badenian, Middle Miocene, Bánd, county Veszprém, Hungary.
- 5a, b, c, d *Zonarina liviae* nov. sp. Paratype 7, coll. THH, No. 912, $\times 1.3$, Lower Badenian, Middle Miocene, Bánd, county Veszprém, Hungary.
- 6a, b, c, d *Zonarina austriaca* SCHILDER, 1925, coll. DFB, No. 7400, $\times 1.3$, Badenian, Middle Miocene, Bulharsko, Pleven, Bulgaria.

Plate 1 – 1. tábla

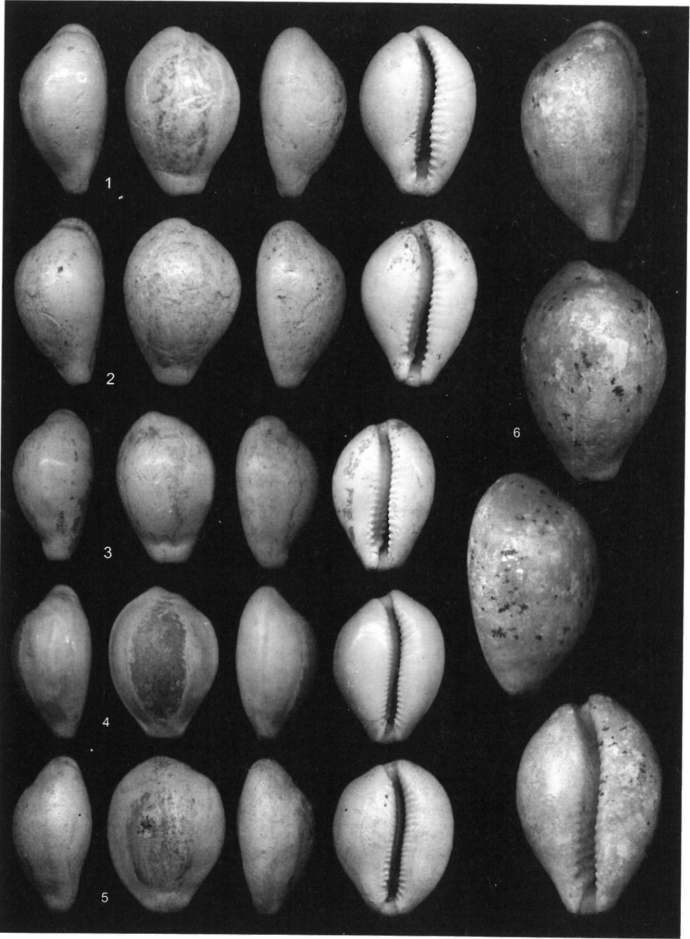


Plate 2 – 2. tábla

