Toarcian gastropods from the Gerecse Mts (Hungary)

by

András GALÁCZ & János SZABÓ

Abstract — A relatively rich gastropod fauna has been found in the Toarcian of the Gerecse Mts, in a facies that is usually extremely poor in benthic fossils just like other localities of the Mediterranean Faunal Province. Nine species are separable in spite of the poor state of preservation. Most of them are deep water dwellers but two species seem “exotic” in the inferable palaeoenvironment.

Keywords — gastropods, Toarcian, Gerecse Mts, Hungary.

Introduction

The Toarcian marl sequence of the Gerecse Mts is a well-known source of fossils, mainly ammonites. Though only a few palaeontological papers were published, the ammonite stratigraphy of the Toarcian localities is well documented by the works of GÉCZY (1984, 1985). The only group besides the ammonites is the nautiloids, which got some attention in the past (PRINZ 1906). Collecting carried out during the past years evidenced that these two cephalopod groups represent almost exclusively the Toarcian marine macrofauna in the Gerecse, similarly to those other places where red marls have also developed.

Under these circumstances it was rather a surprise to collect numerous gastropod specimens in a single locality of the Toarcian red marls. The study of these gastropods coming from Vöröshíd, north of Tardos in the eastern Gerecse revealed that the fauna is exceptional in richness and in diversity as well.

Localities

Toarcian red marls are widespread in the Gerecse Mts. Recently a general description treated the distribution and the overall features of these sediments (CSÁSZÁR et al. 1998). Accordingly, this is a 0.5 to 6 m thick red, thinly-bedded, nodular claymarl, with variable carbonate and clay content, which constitutes the so-called Kisgerecse Marl Formation as lithostratigraphic unit. At its type locality, in the Kis-Gerecse Quarry, it is 3.5 m thick (KONDA 1986), and represents the lower and middle Toarcian, but the lowermost Toarcian Dactylioceras tenuicostatum Zone seems to be commonly missing (GÉCZY 1985). In some places (e.g. in the Tölgyhát Quarry near the northeastern margin of the mountains) a thin black shale layer is intercalated into the lower, Hildaites serpentinum Zone part of the sequence, while in other occurrences the corresponding beds are missing (JENKYNs et al. 1991). Well-preserved ammonites are frequent throughout, giving the chance to date all beds with high stratigraphic precision.

An evaluation of the thickness data from exposures and well logs made clear that there is a tendency of thickening of the Kisgerecse Marl towards the so-called Gorba High, a Jurassic submarine elevation forming now the western part of the Gerecse Mts (CSÁSZÁR et al. 1998). This phenomenon was interpreted as a result of sediment winnowing from the submarine heights into the neighbouring, relatively deeper basin areas.

The most important locality, Vöröshíd is an abandoned quarry on the eastern slope of the Kis-Teke-hegy, near to the Tardos – Sütő road (Figure 1.). The road follows a significant fault-line, which now separates the Gorba Height on west, and the deeper, basinal facies area on east (LANTOS 1997).

At Vöröshíd a series of quarries exposes the uppermost Triassic – Lower Jurassic sequence. KONDA (1987) and recently LANTOS (1997) gave descriptions on the central, biggest quarry, which shows the most complete series. Here the deepest beds are the thick
banks of the Upper Triassic Dachstein Limestone, which are overlain by a ca. 20 m Lower Jurassic carbonate series ranged by KONDA into the Písznica and Tűzkövesdirok Formation, i.e. into the Sinemurian and Pliensbachian. The middle Lias sic layer is covered by some beds of the Toarcian Kisgerecse Marl.

The sequence in the southern quarry, which is the locality of the gastropods described here, is very similar. The uppermost 10 m of the exposed Dachstein Limestone is followed by the pinkish, massive beds of the Písznica Limestone Formation. The 7 to 8 m thick carbonate series seems to represent the whole Sinemurian and Pliensbachian; characteristics of the Tűzkövesdirok Formation cannot be identified. On top of the Písznica Limestone the lower 3.3 m of the Kisgerecse Marl is exposed. Higher parts of the sequence are eroded. Here the Kisgerecse Marl is very clayey, with 1 to 3 cm calcareous nodules, while harder limestone beds are practically missing.

In the present state the exposure would need extensive work for systematic, bed-by-bed collecting. However, the rich fossil material can be sampled from the slope debris, which covers the abandoned face of the old quarry. Ammonites are very abundant: the Lower and Middle Toarcian are represented with Dactylioceras, Polyplectus, Hildaites, Mercaticeras, Hildoceras, Phymatoceras and Frechiella spp., and numerous Phylloceratids and Lytoceratids. Together with the ammonites, several gastropods were collected. They seemingly all came from the same horizons: from the lower and middle Toarcian. The specimens are fragmentary internal casts, a preservation most common in fossils from the red marl facies. Until now 34 specimens were collected. Five species were separable in this material: Eucyclus (Eucyclus) aff. capitaneus (MÜNSTER, 1844); Eucyclus (Eucyclus) aff. tataensis SZABÓ, 1995; Eucyclus (Eucyclus) barnahati SZABÓ, 1995; Eucyclus (Eucyclus) sp.; Eucyclus (Lokuticylus?) sp. and Trétops (sp).

Additionally to the specimens form the Vöröshíd quarry, sporadic examples from other Gerecse Mts localities are also discussed here. One specimen (Marmolatella sp.) came from a new excavation near the Nagy-Písznica quarry. This exposure was occasioned by an exceptional find of a crocodile skeleton discovered by amateur collectors some years ago. The skeletal remains came from the Toarcian limestone just above the typical Kisgerecse Marl, which is about 3 m thick in the area (KONDA 1985, CSÁSZÁR et al. 1998, fig. 8). The red limestone bed giving Marmolatella sp. is of Variabilis Zone age (GÉCZY B. pers. com.). Two other gastropod specimens (Leptomaria sp. and Purpurinae sp.) were found in the Toarcian of the Kis-Gerecse quarry, in the type section of the Kisgerecse Marl Formation. The beds, yielding the specimens (No 89. and 86., respectively), are of middle Toarcian age (Hildoceras bifrons Zone, GÉCZY, unpublished).

**Figure 1** — Maps of the Gerecse Toarcian gastropod localities (modified after KONDA 1985 and 1986).

**Material and palaeoecological indications**

Thirty-two (from 41), more or less fragmentary, inner mould specimens were identifiable but usually with application of the open nomenclature:

- Leptomaria sp.
- Eucyclus (Eucyclus) aff. capitaneus (MÜNSTER, 1844)
- Eucyclus (Eucyclus) aff. tataensis SZABÓ, 1995

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**Eucyclus** (Eucyclus) barnabasi SZABÓ, 1995

Eucyclus (Eucyclus) sp.

Eucyclus (Eokuticyclus?) sp.

Marmolatella? sp.

Tretospira? sp.

Purpuroidea? sp.

The composition of the fauna provides some palaeoecological indications that are more or less conform to those that are widely accepted concerning the depositional environment of the host lithology. The Vöröshíd fauna consists of 32 eucyclid (94%) and 2 purpurinid specimens. Living relatives of Eucyclidae inhabit predominantly bathyal to abyssal bottom of unconsolidated, fine-grained sediments (HICKMAN & MCLEAN 1990, “tribe Calliotropini”). A similar habitat seems feasible also in the case of the Jurassic eucyclids (SZABÓ 1995). The indication of the Tretospira? specimens is uncertain, however, other occurrences suggest preference/tolerance of similar physical conditions to those of the eucyclids. Possibly they belonged to the group of benthiic predators; TAYLOR et al. (1980) regard Purpurinidae to contain the ancestor of the modern carnivorous neogastropods.

Purpuroidea is known from shallow water Mesozoic palaeoenvironments therefore the presence of Purpuroidea? sp. in the Kis-Gerecse seems exotic just like that of the Marmolatella? sp. specimen in the “crocodile” section of Nagypisznicz. In the case of the latter species, belonging to Stomatellidae cannot be completely excluded but living representatives of this family suggest also intertidal – shallow sublittoral habitat (HICKMAN & MCLEAN 1990).

Deep-water biotope and predation on sessile, soft bodied organisms can be outlined for *Eeptomaria* sp. Regarding shell morphology, this Mesozoic genus is the closest relative of the living pleurotomariids.

### Systematics

**Measurements** (in mm and °).

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**Description** — Mode of coiling suggests rather low spired shell, ~100° of spiral angle can be reconstructed. Whorl having quadrangular cross-section and feebly convex outer surface with broad selenizone at midwhorl. Impression of slit (posterior end eroded) extends at least 40° backwards. Peristome prosocline, somewhat prosocytic in both belts neighbouring slit; basal lip prosocytic and slightly opisthocytic. Periphery rounded angular, base slightly convex with median depression, turning into rather narrow umbilicus (phaneromphalous).

**Remarks** — The state of preservation permits only a generic identification of the specimen. In lack of the shell, the shape of whorl surface, the position and width (related to the distance between periphery and suture) of the selenizone are the characters, which distinctly mark belonging to *Leptomaria*, the Mesozoic pleurotomariid genus, which is morphologically most closely related to the extant members of the family.

**Distribution** — Kis-Gerecse quarry, Toarcian (Hildoceras bifrons Zone).

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**Eucyclus (Eucyclus) barnabasi**

- **Material** — Last whorl of a medium sized species.
Eucycloidea Koken, 1896
Eucyclidae Koken, 1896
Genus *Eucyclus* J. A. Eudes–Deslongchamps, 1860
Subgenus *Eucyclus* J. A. Eudes–Deslongchamps, 1860

**Eucyclus (Eucyclus) aff. capitaneus** (Münster, 1844)
(Plate I: 10–11)

aff. 1844 *Turbo capitaneus* Münster — in Goldfuss, p. 91, pl. 194, fig. 1.
aff. 1892 *Amberleya capitana* Münster — Hudleston, p. 277, pl. 21, fig. 12.
aff. 1909 *Eucyclus capitaneus* Münster — Brosamlen, p. 257, pl. 20, figs. 8–9.
aff. 1937 *Amberleya capitana* Münster — Pchelinen, p. 30, pl. 2, fig. 20.
aff. 1982 *Amberleya (Eucyclus) capitanea* (Münster) — Szabó, p. 24, pl. 3, figs. 1–2.
aff. 1997 *Amberleya (Eucyclus) capitanea* (Münster) — Fischer & Weber, p. 135, pl. 21, figs. 12 a–b

**Material** — Four fragmentary inner casts.

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**Description** — High turbiniform shell with convex whorls, bearing two strong carinae reflected on inner cast and resulting spiral angulations. Lower carina giving periphery; third carina visible on base near peripheral one (just overlapped by suture on earlier whorls). Strong nodosity of keels also reflected on youngest whorl of figured specimen (Plate I: 11). Steep, slightly concave and rather wide ramp between upper suture and nearest carina. Other belts between pairs of carinae also slightly concave. Base convex, substitution of strong columella observable. Columellar lip straight but well deviates from coiling axis at parietal region towards suture; consequently: parietal lip short.

**Remarks** — Shape, measurements and the traces of the ornament are well identifiable with those of shelly specimens published from the Bakony Mountains (Szabó, 1982) as *Amberleya (Eucyclus) capitaneus* (Münster, 1844). According to Fischer & Weber (1997), the spiral angle (43°) of these specimens is too low compared to other published specimens in which this value is between 50°–60°. Though in the Gerecse material, there are also specimens having wider (46°, 50°) spiral angle, further studies are necessary on better preserved material to clear up the taxonomical meaning of this and the related differences (more slender shell, somewhat higher whorls, etc).

**Distribution** — Vöröshíd quarry (Kis-Teke-hegy slope); Lower to Middle Toarcian.

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**Eucyclus (Eucyclus) aff. tataensis** Szabó, 1995
(Plate I: 8–9)

aff. 1995 *Eucyclus (Eucyclus) tataensis* sp. n. — Szabó, p. 68, pl. 7, figs. 5–6.

**Material** — Ten specimens, most of them only whorl fragments.

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**Description** — High turbiniform – turriculate moulds with rounded convex whorls, separated by deeply canaliculate suture. Traces of three strong carinae preserved from penultimate whorl as rounded spiral elevations, lowermost one just covered by suture on spire whorls. Periphery rounded (coinciding with middle carina), base convex and anomphalous. Strong columella reflected in casts. Columellar lip straight and parallel to coiling axis; rounded angulations at meetings with parietal and basal lip.

**Remarks** — The holotype of *Eucyclus (Eucyclus) tataensis* Szabó, 1995 has significantly more slender spire therefore the use of open nomenclature is necessary. The apical angle of the (shelly) holotype is 38°, while 48° is measured on the most complete specimen of the available steinkerns (Plate I: 8–9). Though the whole shape suggests identity with *E. (E.) tataensis*, in the given state of preservation other possibilities cannot be completely excluded.

**Distribution** — Vöröshíd quarry (Kis-Teke-hegy slope); Lower to Middle Toarcian.
Material — Four fragmentary, rather poorly preserved specimens.

**Measurements.**

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**Description** — Turriculate form with coeloconical spire outline. Whorls convex with rounded angular periphery. Suture rather deeply canaliculate. Base flattened, somewhat convex. Apparent peristome quadrangular. Two specimens show traces of ornament: nodose double carina at periphery.

**Remarks** — The shape and the measurements of the figured specimen (Plate 1: 14) well agree with those of a section of early spire whorls of the holotype. The ornamented fragments well correspond to the last whorl of the holotype.

**Distribution** — Vöröshíd quarry (Kis-Teke-hegy slope); Lower to Middle Toarcian.

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**Eucyclus (Eucyclus) sp.**

(Plate 1: 12–13)

Material — Eight, more or less fragmentary inner casts.

**Measurements.**

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<td><strong>16</strong></td>
<td><em>25°</em></td>
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**Description** — Moderately high turbiniform – pagodiform, medium-sized species possessing low number of whorls. Whorls strongly convex, sharply angular little below midwhorl. Suture deeply canaliculate; wide, slightly convex, moderately steep ramp between suture and angulation. Angulation corresponds to periphery on last whorl. Base anomphalous, strongly convex but having flattened belt around columella. Three carinae visible on whorls; angulation carrying strongest one, another running nearly in middle of ramp, further one just in line of suture. Less distinct traces of few weaker carinae on central part of base. Undulations of ramp and peripheral carina suggest strong nodosity when shell present.

**Remarks** — Pagodiform species of *Eucyclus* are not rare, however species with a strong carina on the ramp of comparable position has not been found. Therefore, the remains may represent a new species but in lack of shell its knowledge is unsatisfactory for formal designation.

**Distribution** — Vöröshíd quarry (Kis-Teke-hegy slope); Lower to Middle Toarcian.

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**Eucyclus (Lokuticyclus?) sp.**

(Plate 1: 15–16)

Material — A single, badly preserved inner mould.

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**Description** — Fragment indicative of rather low spired shell, consisting of low, convex whorls, separated by gently sloping, deeply canaliculate suture. Periphery angulate, base convex and possibly phaneromphalous (narrowly). Three, strong carinae exposed on penultimate whorl, fourth one partly covered by suture. Middle exposed carina, running nearly at midwhorl, coinciding with periphery on last whorl. Small outer mould area preserved strong, sparse nodes of uppermost carina.

**Remarks** — Three-carinate forms are common in HUDLESTON’s “ornata” species group, however, their whorls are higher, not angulate and the position of the carinae on the whorls is also different. The available specimen most probably belongs to a new Mediterranean species.

**Distribution** — Vöröshíd quarry (Kis-Teke-hegy slope); Lower to Middle Toarcian.
Material — A single inner mould.

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**Description** — Inner mould of large, neritiform-auriform shell. Preserved part little longer than last whorl, being evenly convex in beginning, but more convex at periphery near peristome. Shape suggests presence of wide, slightly convex, ramp-like surface on last half whorl. Low, wide spiral ridge visible on base. Peristome, as well as growth lines on early whorl part and on base, strongly prosocline, prosocyst and almost tangential to penultimate whorl. Egg-shaped peristome, narrowing towards early shell part. Little above periphery, outer lip seems to bear shallow, wide sinus that is also reflected in the scarcely preserved growth lines on the surface of the initial part of last whorl.

**Remarks** — Auriform marine gastropods are quite common in the Triassic and post-Jurassic Neritoidea. From the Triassic genera with this shape, only *Marmolatella* (Neritopsisae, Naticopsinae) has already been doubtlessly found in the Jurassic (CONTI & FISCHER 1984), just in the Mediterranean Faunal Province. Some species of *Marmolatella* have shallow sinus on the outer lip. Another sinus-bearing neritoidean genus is the neritid *Nertona* MORRIS, 1849. However, this genus has a narrow and relatively deep sinus and a globular shape therefore the Gerecse find less probably belongs to this genus.

The trochoidean Stomatellidae (Triassic—Recent) is also composed of auriform genera, one of which, *Mesogena*, has already been found (GRECO 1899, WENDET 1972) in the Mediterranean Jurassic, but sinus bearing form has not been reported from any locality. However, because of the poor preservation, belonging to *Mesogena* cannot be excluded completely.

**Distribution** — “Crocodile” section (Nagy-Piszniecz), Toarcian (Variabilis Zone).

Superfamily ?Littorinoidea GRAY, 1840
Family *Purpurinidae* ZITTEL, 1895

There are two similarly shaped species in the material that have low littoriniform shape with narrow, almost horizontal ramp below the suture. The shape of the available inner moulds permits to range them to a wide choice of genera of different families, being not closely related. The (nearly) contemporaneous ones are: *Purpurinidae* (*Tretospira* KOKEN, 1892; *Angularia* KOKEN, 1892; *Purpuridea LYCETT, 1848; *Purpurina* D’ORBIGNY, 1850), *Naticidae* ([Globulariniae], *Ampullospira* HARRIS, 1897; Pictavia COSSMANN, 1925) or *Pseudamuridae* ([Cerithoidae?], *Pseudamaura* P. FISCHER, 1885). Some of these genera may be synonymous. The way to find the most probable systematic place is the same in case of both Gerecse species, therefore it will be sketched here separately from the detailed descriptions.

*Purpurina* has strong collabral ridges in the shell sculpture that may cause also undulation of the inner shell surface, but its spiral ornament is not reflected on inner mould. The absence of collabral undulations, but presence of traces of spiral ornament on the available specimens suggest therefore belonging to other genus.

*Purpuridea* has also strong collabral and/or nodes along ramp angulation and also spiral ornamental elements that may be reflected on inner shell surface. The trace of the characteristic siphonal outlet, i. e. a backward truncation of the peristome at the foot of columella, which is present in most *Purpuridea* species, also provides a really good tool also for distinction of steinkerns. One of the specimens (see below as *Purpuridea* sp) has traces of spiral cords or angulations and the siphonal notch.

*Angularia* and its subgenera have rather turriculate spire and distinctly protruding siphonal outlet but these characters are not present on the Gerecse specimens.

*Tretospira* is smooth or some species have few spiral cords and/or weak, additional angulation(s) below the ramp. Shell truncation or protrusion at the siphonal outlet are unknown. The other species is probably member of this genus (*Tretospira* sp.).

Other possible systematic place for the latter species could be Globulariniae (*Ampullospira, Pictaria* and *Pseudamaura* in which the siphonal truncation or protrusion is lacking. *Pseudamaura* is also member of Naticidae in earlier systematics, recently KOWALKE & BANDEL (1996) have removed it into an independent family of doubtful Cerithioidean position.) However, these genera are usually without any spiral ornament or have only fine lineation or threads that are not reflected on inner shell surface. Therefore the Gerecse specimens, having distinct traces of spiral keels or cords, probably do not belong to these families.
Toarcian gastropods from the Gerecse Mts

Genus *Tretospira* KOKEN, 1892;

*Tretospira?* sp.

(Plate I: 17–18)

**Material** — Two inner mould specimens.

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**Description** — Littoriniform – bucciniform shell with rather low, gradate spire and convex whors. Estimated number of whors: 5–6, last half tending downwards with significant increase of suture angle. On last three whors, sharp angulation visible that delimits narrow, almost horizontal ramp (sloping 5°–15° abaxially). Ramp flattened, but feebly concave near peristome. Another, wider, flattened belt develops on last whorl below ramp and results widely subangulate periphery. Suture running somewhat below line of this latter angulation. Base convex, anomphalous and having low spiral elevation near columella. Aperture axially elongate; peristome probably continuous and having no other modification reflected on inner moulds than presence of rudimentary siphonal outlet that raises elevation on base, near inner lip. Columellar lip concave, probably having shallow, vertical furrow. Outer lip feebly prosocline and gently parasigmoidal below ramp. One inner mould reflects three low spiral carinae near to each other at periphery.

**Remarks** — The material between infilling of two whors preserved the thickness of the (duplicated) shell; it is one millimetre at the sutural corner of the peristome.

**Distribution** — Vöröshíd quarry (Kis-Teke-hegy slope); Lower to Middle Toarcian.

*Purpuroidea?* sp.

(Plate I: 19)

**Material** — A single specimen.

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**Description** — Subglobular shell of few (max. 5–6) convex (angular) whors; spire low and gradate. Suture canalicate; with narrow ramp below it that slightly convex on earlier whors, but gradually changing into feebly concave on penultimate whor. Sharp angulation delimits ramp abaxially. Below ramp two low elevations indicate further (less distinct) angulations or keels of shell. Lower one running just on periphery, upper one slightly below midway between ramp angle and periphery. Inner mould of last whorl feebly concave between ramp angle and upper spiral elevation. Peristome not completely cleanable from matrix, visible lower part of outer lip prosocline, slightly prosocyt and showing siphonal notch.

**Remarks** — Outward bending from the former growth surface on the inner mould along the siphonal outlet shows that this backward oriented notch is really trace of the original shell and not such truncation that formed during the fossilisation. The shape of the available specimen shows if it were a lower spired variety of *Tretospira?* sp. However, the differences in the spire angle, the number and position of the keels are enough to separate them on species level, but the siphonal notch is a diagnostic character on the generic level.

**Distribution** — Kis-Gerecse quarry, Toarcian (Hildoceras bifrons Zone).

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