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Eucyclidae (Eucycloidea, Gastropoda) as a Liassic palaeoecological index in the Transdanubian Central Range (Hungary)

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(with Plate 7)

Abstract

Beside a revised systematical list of the previously described taxa, designation of *Lokuticyclus* subg. n. *(Eucyclus)* and some new species *[Eucyclus (Eucyclus) tataensis* sp. n., *Eucyclus (Eucyclus) barnabasi* sp. n., *Eucyclus (Lokuticyclus) urkutensis* sp. n., *Eucyclus (Lokuticyclus) kericserensis* sp. n. and *Eucyclus (Lokuticyclus) lokutensis* sp. n. are given below. The studied eucyclids seem to have inhabited similar environments than the living ones.

Key words: Lower Jurassic, Gastropoda, Bakony, Hungary, palaeoecology, new species

Introduction

Members of the superfamily Eucycloidea belong to the most common gastropods in the Jurassic faunas of the Transdanubian Central Range. They are present in most lithological types bearing gastropods, but their occurrences suggest definite dependence on environment. Recent discovery of evolutionary connection to living relatives (MCLEAN 1981) helps to find actualistic data to interpret the facies distribution in the studied area and to complete the Jurassic environmental reconstruction.

Description of the species, only listed here are given in SZABÓ (1982). A species, *Eucyclomphalus cupido* (D'ORBIGNY, 1852) (=?*Eucyclomphalus hierlatzensis* VON AMMON, 1892), previously regarded as member of Eucyclidae seems to be better accomodate in Platyacridae.

The new species are based on old museum material, collected by József FÜLÖP (Tata, Csurgókút, see locality map in FÜLÖP 1976), by Lajos BARTKÓ (Úrkút, Csárdahegy Natural Conservatory Area at the eastern edge of the village) and by József KONDA (Lókút, Kericser; 6th locality in map of KONDA, 1970). The holotypes are deposited in the museum of the Hungarian Geological Survey.

Abbreviations used:

H	=	total height
HL	=	height of last whorl
HA	=	height of aperture
D	=	diameter
W	=	width of aperture
A	=	spiral angle or apical angle and angle of spiral on last measurable whorls in case of coeloconical and cyrtoconical spire (interval given).

An asterisk (*) marks that the value is measured on damaged shell part or on the last measurable section of the shell.

Systematics

Superfamily Eucycloidea KOKEN, 1897
Family Eucyclidae KOKEN, 1897

The superfamily name was proposed by GOLIKOV & STAROBOGATOV (1975) after a long period when even the existence of the nominate family had been not widely accepted. In COSSMANN's (1916) system, *Eucyclus* and the closely related genera belonged to Littorinidae, then WENZ (1938) established his Amberleyidae (Trochonematacea) where *Eucyclus* is only a subgenus in *Amberleya* MORRIS & LYCETT, 1851. COX *in* KNIGHT et al. (1960) introduced superfamily Amberleyacea containing also Platyacridae WENZ, 1938; Cirridae COSSMANN, 1916 and Nododel-

phinulidae COX, 1960. Most of the other taxonomists were influenced in their classification activity overwhelmingly by the latter three systems.

GOLIKOV & STAROBOGATOV (1975) recognised that inclusion of *Eucyclus* as a subgenus in *Amberleya* is erroneous, that is why they proposed usage of Eucyclidae as family name and Eucycloidea as superfamily name instead of Amberleyidae and Amberleyacea, respectively. [By personal observations, the true *Amberleya* MORRIS & LYCETT, 1851 is not member of Eucycloidea. Its most likely systematical place is near to that of *Paraturbo* COSSMANN, 1907 (?Paraturbinidae).]

Formerly, the superfamily was thought a typically Mesozoic group, having some survivors which became extinct during the Oligocene. MCLEAN (1981) recognised that some living gastropods are closely related and he proposed subfamily (Amberleyinae) rank for the extended group in the Trochidae.

HICKMAN & MCLEAN (1990) changed the name to Eucyclinae, containing three tribes: Eucyclini, Chilodontini and Calliotropini. Because of the soft body, mainly radula plan characters, the extant relatives (some Chilodontini and Calliotropini) can be classified within the Trochidae, therefore, HICKMAN & MCLEAN (1990) suggested a new systematical place also for the Mesozoic–Oligocene forms (Eucyclini) in the same family.

From point of view of shell morphology, most important in palaeontological classification, a distinction between "Eucyclini" and "Calliotropini" does not seem to be simple. HICKMAN & MCLEAN (1990) proposed a method, based on the shape of the aperture. In Eucyclini the juvenile and adult apertures are different in shape but similar in the tribe Calliotropini. Unfortunately, the method cannot be checked in all of the members of the tribe Eucyclini. At the same time, the distinction of the Eucyclini from the third tribe ("Chilodontini") needs also a revision because denticle or columellar fold, regarded as specific characters of the Chilodontini, are present in some genera which have been accomodated in the tribe Eucyclini (e.g. *Eunemopsis, Oolitica*).

Without completing a detailed revision at the generic level, the close relation of HICKMAN & MCLEAN's three tribes is conceivable and these taxa seem applicable also for the fossil material. However, the characteristic shell morphology and ornament permit to attribute higher taxonomical rank for them, they will be subfamilies in Eucyclidae KOKEN, 1897 hereby as members of Eucycloidea KOKEN, 1897. A complete revision of the Eucyclidae, together with other (possibly) related Mesozoic families (?) of the Eucycloidea (Nododelphinulidae, Platyacridae and Cirridae) is a subject of another study.

Subfamily Eucyclinae KOKEN, 1897
Genus *Eucyclus* J.A. EUDES-DESLONGCHAMPS, 1860
Subgenus *Eucyclus* J.A. EUDES-DESLONGCHAMPS, 1860

Eucyclus (Eucyclus) alpinus STOLICZKA, 1861
Eucyclus (Eucyclus) capitanaeus MÜNSTER, 1844

Eucyclus (Eucyclus) tataensis sp. n.
(Plate 7, figs 5–6)

Holotypus: Plate 7, figs 5–6.
Locus typicus: Gerecse Mountains, Tata, Csurgókút.
Stratum typicum: Lower Toarcian, red, manganiferous limestone ("Csurgókút Limestone").
Derivatio nominis: from the name of the town in which the type locality can be found.
Diagnosis: Turriculate shell of convex whorls; rounded periphery; five tubercled cords on penultimate whorl.
Material: four, fragmentary, shelly specimens, one is relatively well preserved but badly damaged at the apex and the aperture.
Measurements:

H	=	*57
HL	=	*31.5
HA	=	*20.5
D	=	26.5
W	=	-
A	=	33°

Description: Species having rather large, high turbiniform shell consisiting of numerous whorls. Because of moderately turriculate spire, *Eucyclus (E.)* sp. n.? resembles caenogastropod shell form. Juvenile spire outline slightly concave. Whorls convex and separated by deep channel of suture. Periphery occupied by strong spiral cord (carina). Base convex and flattened near columella. Entire aperture cannot be studied. Cross-section of last whorl and damaged peristome of another specimen suggest aperture shape axially ovate as common in *Eucyclus (Eucyclus)*. Mentioned peristome fragment consisted of parietal lip and part of basal lip. This portion of shell tapering and appearing like narrow callosity.

Spiral ornament consisted of strong, tubercled cords both on whorls and base. Their interspaces crossed by delicate, subregularly repeating collabral threads; their orientation prosocline and slightly opisthocyrt. Strongest spiral cord (= weak carina) gives periphery, strength of others gradually decreasing with increasing distance from periphery. Number of cords: five on all visible spire whorls, lowermost one just along suture or just overlapped by subsequent whorl. Central part of base rather densely covered by (8–10) cords. Size of tubercles nearly equal on cords of same whorl but smaller on basal cords than on last whorl.

Remarks: One of the most similar species is HUDLESTON's *"Amberleya densinodosa"*, is an *Eucyclus (Eucyclus)* in fact. The ornaments are quite near (number of spiral cords, strength and orientation of collabral threads, size of tubercles) but the dimensions are significantly different: *Eucyclus densinodosus* has (15–20°) bigger spire angle, lower and fewer whorls.

With its turriculate spire, the type species, *Eucyclus (Eucyclus) obeliscus* (J. A. EUDES-DESLONGCHAMPS, 1860), is also resembling but the shape and the dimensions of the whorls are different, the periphery is sharply carinate.

With the same spire angle and not too different other measurements, *Eucyclus (Eucyclus) elongata* (HUDLESTON) has almost the same shape as *E. (E.) tataensis* sp. n., however, the number of spiral cords of the whorls is smaller and they are stronger in the latter species.

Eucyclus (Eucyclus) alpinus STOLICZKA, the possible ancestor of *E. (E.) tataensis* sp. n., differs in its bigger spiral angle (lower shell), in having two more spiral cords on the penultimate whorl and in bearing fine growth lines instead of collabral threads. However, some of the stratigraphically youngest (Domerian) *E. (Eucyclus) alpinus* specimens, figured by GEMMELLARO, M. (1911), show transitions in shape, tending to be as turriculate as *E. (E.) tataensis* sp. n.

Distribution: Gerecse Mts., Tata, Csurgókút – Lower Toarcian, massive, red, ferro-manganiferous limestone ("Csurgókút Limestone Fm."; for more details see: FÜLÖP 1976, p. 44.).

Eucyclus (Eucyclus) barnabasi sp. n.
Plate 7, fig. 4

Holotypus: Plate 7, fig. 4.

Locus typicus: Gerecse Mountains, Tata, Csurgókút.

Stratum typicum: Lower Toarcian, red, manganiferous limestone ("Csurgókút Limestone").

Derivatio nominis: from the christian name of Professor Barnabás GÉCZY.

Diagnosis: Turriculate shell of coeloconical outline; flattened ramp on whorls; nodose carina at angular periphery.

Material: a single, shelly specimen, badly damaged at the apex and the aperture.

Measurements:

D = *21.5
W = *10.5
A = *14–16°

Description: Medium sized, rather turriculate shell of numerous convex whorls. Outline of spire concave (coeloconical). Moderately wide ramp on whorls between suture and spiral carina, running little above another carina, giving periphery on last whorl. Ramp steep in earlier whorls but its angle to axis gradually growing to last whorl. Surface of ramp flattened, except both edges where narrow concave bands can be found. Below sharp periphery, less concave base suggested by its preserved part and shape of whorls than common in *Eucyclus*. Cross section of strong columella visible.

Beside two prominent spiral carinae, mentioned, one spiral cord exposed on whorls just above suture and one spiral thread runs slightly below middle of ramp. To these four spiral ornamental elements of whorls other cords of base added (8–10 of them could be estimated if their density were similar to that on preserved outer part of base). Strength of spiral thread on ramp not changing on preserved whorls, but other spiral elements become stronger toward last whorl. Fine granulae seat on ramp thread and nudulae ornament carinae at periphery, basal cords bear granulae, too. Collabral ornament consists of delicate, slightly prosocline growth lines.

Remarks: With its coeloconical spire and the ramp on the whorls, *E. (Eucyclus) barnabasi* is a unique species in its genus.

Distribution: Gerecse Mts, Tata, Csurgókút – Lower Toarcian, red, ferro-manganiferous limestone ("Csurgókút Limestone"; for more details see: FÜLÖP 1976, p. 44.).

Subgenus *Lokuticyclus* subg. n.

Type species: *Eucyclus (Lokuticyclus) urkutensis* sp. n. (see below).

Name: Composed of the name of a village (Lókút) near to a locality (Kericser) which yielded shells belonging to the new subgenus and the latinized form (cyclus) of a Greek word κυκλας (= round, roundish).

Diagnosis: Like *Eucyclus* but phaneromphalous.

Description: Medium sized gastropods of thin-walled shells. Their shape high to low littoriniform, broadly phaneromphalous forms tend to have conical outline. Granulae on spiral cords of known species of *Lokuticyclus* subg. n. not so definite than in most of *Eucyclus (Eucyclus)* species and base may be much less convex. Umbilicus may be from quite narrow to rather broad.

Remarks: Some of the *Lokuticyclus* species were identified by SZABÓ (1982) as members of *Eucyclomphalus* VON AMMON, 1892 because of the presence of an umbilicus in the shells. However, *Eucyclomhalus* has some additional characters which distinguish it from *Lokuticyclus* subg. n. In *Eucyclomphalus* the spire is conical or pagodiform, there is a ramp on the whorls, delimited abapically by an angulation, bearing a strong, nodose cord or carina that gives the periphery. The ramp is ornamented only by growth lines (in *Lokuticyclus* subg. n. there are spiral cords between the outermost part of the whorls and the upper suture, the shell region, corresponding to the ramp of *Eucyclomphalus*.

Because of the thin shell, the preservation of the specimens is usually bad. Neither embryonal shell or entire peristome have yet been found.

Distribution: Mediterranean Province – Lower and Middle Liassic.

Eucyclus (Lokuticyclus) urkutensis sp. n.
Plate 7, figs 7–9

Holotypus: Plate 7, figs 7–9.
Locus typicus: Úrkút, Csárdahegy.
Stratum typicum: Hierlatz Limestone Formation, Sinemurian.
Derivatio nominis: after the type locality.
Diagnosis: High littoriniform, narrowly phaneromphalous shell of slightly convex spire outline. Reticulate ornament of spiral cords and collabral riblets on juvenile whorls, only spiral cords, and fine, dense growth lines on last whorl.
Material: A single, inner cast specimen with shell fragments.
Measurements:

H	=	*21
HL	=	14
HA	=	*10
D	=	*13
W	=	–
A	=	55–45°

Description: Shell of slightly convex spire outline ("cyrtoconical"). Convex whorls, separated by moderately deep canal of suture. Base strongly convex, rounded angulation around the umbilicus. This angulation, though no element of the peristome preserved, suggests siphonal outlet like modification at foot of "umbilical" lip.

On the earliest preserved whorl six spiral cords appear, their number increases, after three whorls, to seven to penultimate whorl. On juvenile shell spiral cords crossed by subregularly repeating, suture to suture collabral cords of same strength as spiral ones. Transverse cords gradually weaken and become shorter from lower suture, then restricted to narrow band along uppermorst spiral cord on last preserved whorl. In crossing points of cords small granulae sit which disappear little after collabral cords. On last visible whorl granulae present only on two uppermost spiral cords. Base seems also covered by spiral cords, denser than on whorls.

Growth lines slightly prosocline with shallow, just visible opisthocyrt sinus above middle of last preserved whorl. Growth lines extremely fine and dense.

Remarks: The specimen does not seem to represent completely adult stage. More exactly, the shelly part of the base shows that at least another whorl is lacking.The basal cords are almost completely resorbed within the shell as it is shown by the preserved part of the ?last whorl.

In other regions there are published species of similar shapes but without information about presence or absence of an umbilicus. The most similar of them is *"Turbo" ferryi* DUMORTIER, 1864 because of the similar ornament [the number of spiral cords is only little more (7) than in the whorl of the same diameter in *E.(L.) locuticus* sp. n. (5)]. However, on the basis of the considerably lower spire [H/Du ≫ 1.4 while H/D ≫ 2.0–2.2 can be calculated in *E. (L.) lokutensis* sp. n. at the same diameter], the distinction is possible without other characters.

A distinction from *E. (Lokuticyclus) kericserensis* sp. n. (see below) is less simple because of the similar shapes. The number of spiral cords on the (apparent) penultimate whorl gives a good basis for separation: seven in *E. (Lokuticyclus) urkutensis* sp. n. and only five on *E. (Lokuticyclus) kericserensis* sp. n. Beside this, the latter species has subregularly repeating collabral threads between the spiral cords even on the last whorl where only extremely fine growth lines appear in *E. (Lokuticyclus) urkutensis* sp. n.

On the basis of its lower spired shape and the few (four) spiral cords on the penultimate whorl, *E. (Lokuticyclus) lokutensis* sp. n. (see below) is well separable.

E. (Lokuticyclus) urkutensis sp. n. is easily separable from *E. (L.)* aff. *campiliensis* on the much narrower umbilicus, the higher number of spiral cords on the whorls, the density of the collabral elements and the dimensions.

Distribution: Bakony Mts, Úrkút, Csárdahegy – Hierlatz Limestone Fm., Sinemurian.

Eucyclus (Lokuticyclus) kericserensis sp. n.
Plate 7, figs 10–11

1982 *Eucyclomphalus* sp. – SZABÓ, p.27., Pl. III: fig. 10.

Holotypus: Plate 7, figs 10–11.
Locus typicus: Lókút, Kericser.
Stratum typicum: Hierlatz Limestone Fm., Pliensbachian (Davoei Zone).
Derivatio nominis: the excavation, yielded the type specimen, is on the slope of Kericser Hill, near village Lókút in the Bakony Mountains.
Diagnosis: High littoriniform, narrowly phaneromphalous shell. Spiral cords on spire and base. Subregularly repeating, fine, collabral threads between spiral cords on all whorls.
Material: calcitic infilling of a single specimen with preserved shell portions.
Measurements:

H	=	*21
HL	=	*13
HA	=	*9
D	=	*14
W	=	*9
A	=	55°

Description: Extremely thin-walled shell, consisted of convex whorls and base, suture in moderately deep canal. Narrow umbilicus, joining to base with rounded

angulation. Peristome unknown but whorl cross section suggests similar form than in *Eucyclus*.

Spiral cords present on whorls and base, their number five on penultimate whorl; strongest one runs on periphery. Denser spiral cords on base (badly preserved). Collabral threads, typical to Eucyclidae, between spiral cords. Number of threads three in one millimetre on last whorl. Some short, less damaged parts of spiral cords suggest presence of tubercles at meeting points with collabral riblets.

Remarks: Most similar species to *E. (Lokuticyclus) kericserensis* sp. n. is *E. (Lokuticyclus) urkutensis* sp. n. (see distinction above); a close phylogenetical connection between them is very likely.

E. (Lokuticyclus) aff. *campiliensis* (DE STEFANI, 1887) is distinguishable on its wider umbilicus, the rather conical spire and the denser collabral threads (five in one millimetre on the last whorl at the periphery, while only three in *E. (L.) kericserensis* sp. n.).

E. (Lokuticyclus) lokutensis sp. n. (see below) is lower spired, consequently having a more globular shape than *E. (Lokuticyclus) kericserensis* sp. n. The number of spiral cords on the penultimate whorl is less, only four in *E. (Lokuticyclus) lokutensis*.

Distribution: Bakony Mts, Lókút, Kericser – Pliensbachian (Davoei Zone).

Eucyclus (Lokuticyclus) lokutensis sp. n.
Plate 7, figs 12–13

Holotypus: Plate 7, figs 12–13.
Locus typicus: Lókút, Kericser.
Stratum typicum: Hierlatz Limestone Fm., beds with Upper Sinemurian and Lower Pliensbachian (Obtusum to Ibex Zones) mixed fauna.
Derivatio nominis: the excavation, yielded the type specimen (Kericser), is near village Lókút in the Bakony Mountains.
Diagnosis: Low littoriniform, narrowly phaneromphalous shell. Few spiral cords on spire whorls, numerous on base. Extremely fine growth lines as only collabral ornament on adult whorls.
Material: a single, damaged inner mould specimen with preserved shell portions.
Measurements:

HL	=	*21.5
HA	=	*15
D	=	21
A	=	55°

Description: Low littoriniform, cyrtoconical species of extremely thin-walled shell, having convex whorls and strongly convex base. Rim of umbilicus subangulate. Peristome not preserved, whorl cross section suggests *Eucyclus*-type apertural region. Cross section of "umbilical" lip shows moderate thickening on last peristome.

Number of spiral cords four on penultimate whorl, one of them just above suture. Cords on base (12–14) of similar strength than on whorls but more closely spaced. Interspaces between them crossed by delicate growth lines. No evidence for presence of tubercles on spiral cords has been found.

Remarks: The spiral angle value given is measured on last whorl, the apical angle must be much higher because of the cyrtoconical shape.

The strongly different shape, the difference in the number of exposed spiral cords on the penultimate whorl and in the width of the umbilicus of the two species gives an easy way of distinction in case of *E. (Lokuticyclus) lokutensis* sp. n. and *E. (Lokuticyclus)* aff. *campiliensis* (DE STEFANI, 1887). (See distinction from other *Lokuticyclus* species above.)

Distribution: Bakony Mts., Lókút, Kericser – Hierlatz Limestone Fm., beds with Upper Sinemurian–Lower Pliensbachian (Obtusum to Ibex Zones) mixed fauna. (The specimen does not show any trace of rewoking, its Carixian age seems to be likely.)

Eucyclus (Lokuticyclus) aff. *campiliensis*
(DE STEFANI, 1887)

aff.	1887	*Pleurotomaria campiliensis* DE STEFANI, p. 45., pl. 1.: figs. 12–13.
	1982	*Eucyclomphalus* aff. *campiliensis* (DE STEFANI, 1887) – SZABÓ, p.26., pl. III: figs. 8–9.
cf.	1991	*Eucyclomphalus* aff. *campiliensis* (DE STEFANI, 1887) – CONTI & MONARI, p. 273., pl. 8., figs. 15–16.

Remarks: Detailed description of the specimens belonging to this species is given by SZABÓ (1982), marked in the list of synonyms. Unfortunately, a possibility for a comparison of the Bakony specimens to DE STEFANI's originals has not yet been found, therefore the level of species identification remains doubtful. The rather poor preservation of the specimens, published by CONTI & MONARI (1991) under the same name, does not make possible a doubtless identification with the Bakony Mts species.

Distribution: ??Northern Apennines – Sinemurian; Bakony Mts, Upper Sinemurian–Lower Pliensbachian (to Davoei Zone); ?Western Pontids: Raricostatum to Ibex Zone

Genus *Riselloidea* COSSMANN, 1909
Riselloidea multistriata (BÖCKH, 1874)

Riselloidea noszkyi sp. n.
Plate 7, figs 1–3

Holotypus: Plate 7, figs 1–3.
Locus typicus: Úrkút, Csárdahegy.
Stratum typicum: Hierlatz Limestone Fm., Sinemurian.

Derivatio nominis: from the family name of Hungarian geologist Jenő NOSZKY who collected the type specimen.

Diagnosis: small size; ornament of strong spiral cords, sparse on whorls, dense on base; collabral ribs on whorls, dense collabral threads on base; cords and ribs reflected on inner cast.

Material: three bad preserved specimens, one of them shows satisfactorily the specific characters.

Measurements:

H	=	*14
HL	=	*10
HA	=	*7
D	=	*13
A	=	70°

Description: Shell trochiform, rather small sized. Spire nearly conical, whorls and base moderately convex, suture in shallow canal. Periphery angulate. Base more flattened than whorls and anomphalous. Peristome not preserved.

Ornament of three spiral cords on last and penultimate whorls, fourth one on periphery, overlapped by suture on earlier whorls. Collabral ribs of strength, similar to that of spiral cords. Ribs stronger at upper suture and gradually weaken toward lower edge of whorls. Tubercles at crossing points of ribs and cords. Dense spiral cords on base, fine collabral threads cross them. Growth lines and other collabral elements weakly prosocline.

Remarks: *Riselloidea noszkyi* sp. n. has sparser ornamental elements on the whorls than *R. multistriata* (BÖCKH, 1874) and collabral elements are much weaker, only cords in the latter species, the dimensions are also significantly different.

Morphologically and by the stratigraphical occurrence, *Riselloidea noszkyi* sp. n. may be the ancestor of *Riselloidea multistriata* (BÖCKH, 1874).

Distribution: Bakony Mts, Úrkút, Csárdahegy – Sinemurian; Sümeg, Mogyorósdomb – Upper Sinemurian.

Subfamily Chilodontinae WENZ, 1938
Genus *Wilsoniconcha* WENZ, 1939

Wilsoniconcha? cf. *biplicata* M. GEMMELLARO, 1911
Plate 7, fig. 14

Material: a naturally prepared cross section on a weathered rock surface, a narrow outer shell part shows the ornament.

Measurements:

HA	=	5.1
D	=	6.5
W	=	4.7
A	=	?–22°

Description: High spired, cylindroconical, rather small shell. Whorls weakly convex, suture in shallow canal. Periphery rounded, base strongly convex and anomphalous. Inner space of whorls quadrangular in juvenile shell part, ovate (drop shaped) just like peristome. In whorls, V-shaped cross section of two strong and sharp columellar folds, having rounded, denticle like end at inner lip.

Ornament consists of dense spiral cords, crossed by slightly prosocline collabral threads. Granulae at crossing points.

Remarks: The specimen seems to be the member of *Wilsoniconcha*, the only character differing from its description is that columellar folds are present instead of denticles. It is necessary to clear up whether it is a real difference, or the interior of *Wilsoniconcha* has been unsatisfactorily known.

M. GEMMELLARO (1911) established a new genus *(Cupaniella)* for his species and compared to procerithiid genera. There is no doubt that *"Cupaniella biplicata"* belongs to Chilodontinae. If the difference from *Wilsoniconcha* is real, it should be examined what is the meaning of that. More exactly: is *Cupaniella* a synonym of *Wilsoniconcha*, or its subgenus, or really an independent genus?

Open nomeclature is used in case of the species name, because the mesurements are not well comparable owing to the bad preservation and the cross section of the folds are different from that in GEMMELLARO's figure.

Distribution: Bakony Mts, Lókút, Kericser – Hierlatz Limestone beds with Upper Sinemurian–Lower Pliensbachian (Obtusum to Ibex Zones) mixed fauna; ?East Sicily, Galati, Rocche Rosse, Upper Pliensbachian.

Palaeoecology

Reconstruction of the Jurassic environment in the Transdanubian Central Range and in other Tethyan areas, characterised by similar rock types and faunas, have been continuously attempted. Because modern counterparts of the facies do not exist in most cases, some elements of the reconstructions (e.g. palaeogeographical position or depth of water) vary considerably. Other elements [e.g. tectonical control of the sedimentation and pelagic origin of the red(dish), condensed sequences] are rather widely accepted. Eucyclids seem to be one of the gastropod groups which can add reliable data to eliminate some uncertainties.

Here, the paleoenvironmental model, applied to palaeoecological analysis of brachiopods by VÖRÖS (1986) is adapted to reach the possible highest compability. Within the studied stratigraphical interval (Sinemurian–Toarcian) where the above eucyclids have been found, two main facies groups occur in the the Transdanubian Central

ange. One closely connected to submarine topographic eights, the other to the basins. These morphological lements developed during submergence of a former (Late riassic–Hettangian) cabonate platform of a passive ontinental margin along the Tethys (GALÁCZ et al. 1985). he gastropods occur in two main lithological types, onnected to the elevated sea bottom parts. One (massive, d, manganese-oxide bearing limestone) is regarded by ÖRÖS (1986) as deposited on the top of the submarine ills (?mounts) and the other ("Hierlatz Limestone") eposited on the slopes and at the foot (in the basin). The only lithological type of the basins which have contained gastropods is the condensed red, nodular, ammonite bearing limestone (ammonitico rosso limestone) but most frequently in localities where interfingering with cherty, crinoideal limestone (fluxoturbidite around "seamounts") or with sponge spiculae bearing, cherty limestone (autochtonous) is observed.

Eucyclids show definite dependence on different environments, represented by the above lithological types, as Table 1 demonstrates.

able 1. Distribution of the specimens of the Carixian eucyclid genera in the main lithological types.

	red, manganiferous limestone top of "seamounts"	Hierlatz limestone slope or foot of "seamounts"	red, nodular limestone basins
Lokuticyclus	0	5	0
Risselloidea	3	5	6
Eucyclus (s. s.)	0	6	15
?Wilsoniconcha	0	1	0

From these three main lithological types, the red, anganiferous limestone and the red, nodular limestone ontain predominantly autochtonous gastropods. The ierlatz Limestone may contain gastropods both from the p of the submarine heights and from the basin if depoted at the foot of the "seamounts". From the point of iew of palaeobathymetry, it means that all of the gastroods (and other fossils) adapted to different depths may ccur together in this latter limestone. The red, maniferous limestone ("seamount" top) may origin from ifferent depths and not necessarily representing the allowest water environments. This means that the only, latively "fix point" is the red nodular limestone in a laeobathymetrical analysis, started from the facies.

On the top of the submarine heights the hard substrate nd in the basins the soft (unconsolidated) sediments are e more probable.

The specimen numbers in Table 1 show that Eucycnae genera and subgenera preferred the deeper water nvironments (slope and mainly basin) probably with nconsolidated substrate in the Transdanubian Central ange. The frequency in the Hierlatz Limestone seems to e increased by the probably hillfoot deposition at the ocality, considered (Lókút, Kericser), and by the more vourable fossilisation possibilities (weaker subsolution) f this lithological type.

The water depth, suggested by VÖRÖS (1986) for the slope and basin environments, is similar to that can be estimated from the actualistic data of the studied gastropod group. Living nearest relatives of the Mesozoic eucyclids (Calliotropinae) occur predominantly in bathyal (>200 m) to abyssal depths of offshore regions on unconsolidated sediment, and they seem to be adapted to cool and cold water (with submergence in equatorial regions); sometimes their individuals locally dominate slope communities (HICKMAN & MCLEAN 1990). The last statement is true also for the poor gastropod associations of the known Toarcian faunas in the Transdanubian Central Range where they give 80–100 % of the specimens.

The living members of the Chilodontinae inhabit primarily tropical intertidal and shallow subtidal biotopes (HICKMAN & MCLEAN 1990). Facies of the Western European Jurassic localities of the Chilodontinae (e.g. Inferior Oolite) suggests a habit similar to that of the living forms. Because the group does not seem to change habit since the Jurassic, the presence of the only Chilodontinae specimen of *?Wilsoniconcha* cf. *biplicata* (M. GEMMELLARO, 1911) in the Lókút, Kericser Hierlatz Limestone fauna suggests that some parts of the submarine height in the vicinity of the locality reached the depths near the tidal zone during the Late Sinemurian and/or the Early Pliensbachian.

Conclusion

Actualistic data about the habit of eucyclids seem to ree in the Transdanubian Central Range with those of at can be concluded from the palaeoenvironmental econstruction. Eucyclinae lived in bathyal (?abyssal) epths on unconsolidated sediments. Presence of Chilontininae is regarded as a new datum to (subordinate) presence of shallow subtidal environments on the top of the Early to Middle Liassic submarine topographic heights.

While in the Transdanubian Central Range the reconstructed habitat of the eucyclids is similar to that of the living nearest relatives (Calliotrpinae), HICKMAN &

McLEAN (1990) have found highest abundance in Tethyan shallow water, reef associated paleoenvironments". However, their data seem to be mainly collected from the facies of the Western European epicontinental seas.

Further studies are necessary to decide if these differencies are real, or there are some equivalent elements in the habits, reconstruable in the two areas.

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Plate 7

Figs 1–3. *Riselloidea noszkyi* sp. n., 2×, holotype, J 11464.
Fig. 4. *Eucyclus (Eucyclus) barnabasi* sp. n., 1.5×, holotype, J 11460.
Figs 5–6. *Eucyclus (Eucyclus) tataensis* sp. n., 1.5×, holotype, J 11459.
Figs 7–9 *Eucyclus (Lokuticyclus) urkutensis* subg. and sp. n., holotype, 7–8: 2.3×; 9 (details of ornament on hootype): 5.3×, J 11461.
Figs 10–11. *Eucyclus (Lokuticyclus) kericserensis* subg. and sp. n., holotype,, 10: 1.3×; 11 (details of ornament on holotype): 5.5×, J 11462
Figs 12–13. *Eucyclus (Lokuticyclus) lokutensis* subg. and sp. n., holotype, 1.5×, J 11463.
Fig. 14. *Wilsoniconcha* ? cf. *biplicata* (M. GEMMELLARO, 1911), 7×