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Additional Middle to Upper Triassic ostracod faunas from the boreholes of Transdanubian Central Range (Hungary)

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(with 2 figures, 2 tables and 3 plates)

Relatively diverse ostracod faunas from Middle to Upper Triassic (Ladinian to Rhaetian) beds of the Transdanubian Central Range in Hungary are described and figured. The benthic faunas from five boreholes (Bat-2, Bút-2, Bht-6, Met-1 and Rzt-1) consist of 25 taxa belonging to 17 genera. Two species are new: *Ceratobairdia crassispinosa* n. sp. and *Dicerobairdia latispinosa* n. sp.. Based on ecological characteristics the studied benthic ostracod assemblages different normal marine deep to shallow sublittoral palaeoenvironments were recognized in this region of the Tethys Ocean. Moreover, the Carnian salinity crisis caused by a global lowstand could be proven.

Introduction

The knowledge about the Middle to Upper Triassic ostracod faunas from Hungary is sporadic and incomplete. First descriptions and illustrations of Triassic marine ostracods from Hungary were published by MÉHES (1911). From the Transdanubian Central Range, further studies have been made by BUNZA & KOZUR (1971), KOZUR (1970a; 1971abc; 1972b) and MONOSTORI (1991; 1995) about Anisian, by KOZUR (2004) and MONOSTORI & TÓTH (2013) about Ladinian, by SZÉLES (1965), BUNZA & KOZUR (1971), KOZUR (1971c; 1972a), KRISTAN-TOLLMANN et al. (1991) and MONOSTORI (1994) about Carnian and by KOZUR & ORAVECZ-SCHEFFER (1972) about Rhaetian ostracods. Moreover, from Upper Ladinian to Lower Carnian beds of the Mecsek Mts freshwater ostracods were described by MONOSTORI (1996). The main aim of the present work is to give a detailed modern systematic description of Middle to Late Triassic ostracods from five boreholes located in Transdanubian Central Range, W-Hungary. Moreover, a brief palaeoecological interpretation of the faunal composition is planned to complement the knowledge about the depositional environment of the studied Triassic formations. Documentation of this fauna can provide new data about the composition of ostracod assemblages in different environments of Triassic Tethys Ocean.

Geological setting and stratigraphy

The studied five boreholes (Barnag-2 (Bat-2), Balatonhenye-6 (Bht-6), Bakonykúti-2 (Bút-2), Mencshely-1 (Met-1) and Rezi (Rzt-1)) are situated in the Transdanubian Central Range, western Hungary (Fig. 1). The lithostratigraphical sections of the studied boreholes are shown in Fig. 2.

The studied sequence in the borehole Bút-2 consists of thick grey tuff beds alternating with thin crinoidal-brachiopodal marl and limestone layers, from where the samples were obtained, belonging to the Ladinian Buchenstein Formation. It is underlain by the Megyehegy Dolomite. The tuffaceous beds contain carbonized plant fragments in great abundance.

The borehole Met-1 penetrated Upper Ladinian to Carnian succession bearing the studied microfauna in thickness 440 m starting with pelagic thinly bedded grey cherty limestone of Füred Formation (HAAS & BUDAI 2004). This is overlain by thick grey marly-calcareous marly series of Veszprém Marl with rounded limestone intraclasts and mollusc fragments. This succession is strongly tectonized and its the upper part, there are nodular limestone beds of Nosztor Limestone Member in 20-25 m thickness with mollusc, Phyllopoda, brachiopod and crinoid fragments (CSILLAG & BUDAI 1987, unpublished report, Archives of Geological and Geophysical Institute of Hungary).

The studied Triassic sequences in boreholes Bat-2 and Bht-6 started with unbedded brownish grey crinoid, brachiopod and mollusc bearing calcareous marl and marly limestone layers of Csicsó Marl Member (Veszprém Marl Formation). Its upper part is strongly pyritized and dolomitized in borehole Bht-6. Moreover, under the overlaying Sándorhegy Formation there is a 1.5 m thick crinoidal limestone bed and a marl layer with bioclasts, oncoids and limestone intraclasts (BUDAI et al. 1999). The lower part of the Sándorhegy Formation, namely Pécsely Member is represented by bioturbated, intraclastic microcrystallized limestone, calcareous marl, dolomarl and dolomite series in the borehole Bht-6 and by thinly bedded grey marly limestone layers intercalated with laminited bituminous limestone beds with slumps and fish scales in the borehole Bat-2. In the upper part of the succession (Barnag Member) there are thin marl, calcareous marl and limestone beds with oncoids, ichnofossils, biogen fragments (brachipods and echinoderms) in lenticular bodies and mollusc bearing lumachella in different levels. The series of the Barnag Member in Bht-6 is very similar but thinner and underlaying with a dolomite body of Ederics Formation. The differences between the sequences of the studied boreholes can be explained by the palaeogeographical position. The layers of the borehole Bht-6 deposited proximal to the carbonate platform during the Carnian age. In both boreholes the Sándorhegy Formation is overlain by the Main Dolomite Formation (BUDAI et al. 1999).

Additional samples came from the Norian to Rhaetian Kössen Formation in Rzt-1. At Rezi the Kössen Formation consists of thinly bedded or laminited grey siltstone, marl, dolomarl, calcareous marl and clayey marl layers with mollusc lumachella in different levels. The Triassic succession is overlain by Pannonian strata (BUDAI 1987, unpublished report, Archives of Geological and Geophysical Institute of Hungary; BUDAI et al., 1999).

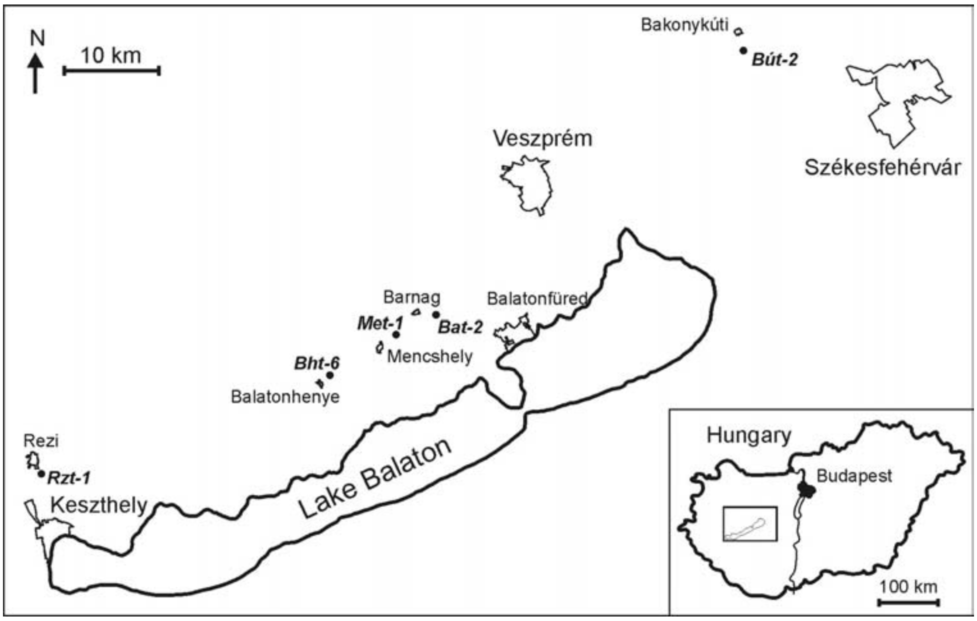

Fig. 1. Location of the studied boreholes in a simplified map of the Transdanubian Central Range, Hungary.

Material and methods

Seventy-six samples from five boreholes of the Transdanubian Central Range were studied for their ostracod content (Fig. 1). For each sample (n=8) from borehole Bút-2, about 200-300 g of air-dried silicified limestone was soaked in a dilute solution of chloridic and acetic acids to extract the silicified skeletal material.

For the microfaunal study of Triassic series in the boreholes Bat-2, Bht-6, Met-1 and Rzt-1, the samples were soaked in a dilute solution of hydrogen peroxide or treated by acetolysis following a protocol originally worked out by LETHIERS & CRASQUIN-SOLEAU (1988) with a slight modification to extract the carbonate skeletal microfauna. The palaeoecological interpretation is based on mainly the qualitative analyses and the semi-quantitative (percentage distribution) analyses of the specimens of the different taxa or groups. Unfortunately, in many samples there is very low, unrepresentative number of specimens.

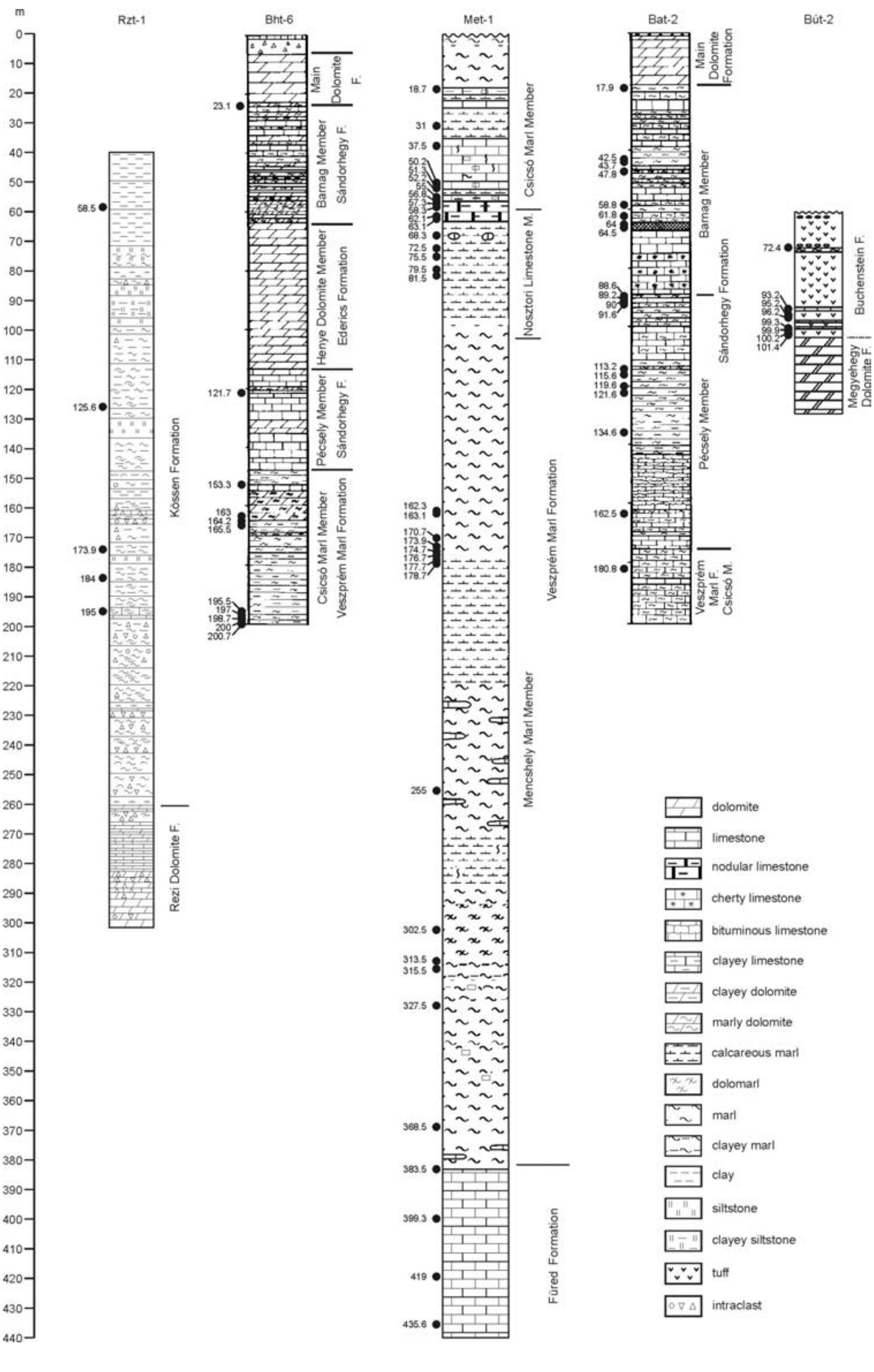

Fig. 2. Lithological logs of the studied boreholes representing Ladinian to Rhaetian sequences of the Transdanubian

Central Range (modified after BUDAI ET AL. 1999 and HAAS & BUDAI 2004).

Systematic palaeontology

Classification of the ostracods follows that of BECKER (2002), HORNE et al. (2002) and WHATLEY & BOOMER (2000). The specimens are deposited in the Department of Palaeontology of Eötvös University and in the Eötvös Museum of Natural History (Budapest, Hungary). Abbreviations: L=length, H=height and d=diameter. Number of specimens of the described taxa can be found in Appendix 1-2.

Class Ostracoda LATREILLE, 1802
Subclass Myodocopa SARS, 1866
Order Halocyprida DANA, 1853
Suborder Cladocopina SARS, 1866
Superfamily Cladocopoidea SARS, 1866
Family Polycopidae SARS, 1866
Subfamily Polycopinae SARS, 1866
Genus *Polycope* SARS, 1866
Type species: *Polycope orbicularis* SARS, 1866

Polycope aff. *aghdarbandensis* KRISTAN-TOLLMANN, 1991
Pl. 1, fig.1.

Remarks: The reticulation pattern is very similar to *Polycope aghdarbandensis* described by KRISTAN-TOLLMANN (1991, see pp. 197-198, pl. 1, figs 10-12) from Ladinian beds of NE-Iran but the cross-ribs are less developed than that of the holotype.
Dimensions: d=0.3 mm.
Occurrence: Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper).

Subclass Podocopa MÜLLER, 1894
Order Platycopida SARS, 1866
Suborder Platycopina SARS, 1866
Superfamily Cytherelloidea SARS, 1866
Family Cytherellidae SARS, 1866
Genus *Cytherella* JONES, 1849
Type-species: *Cytherina ovata* ROEMER, 1840

Cytherella cf. *persiensis* CRASQUIN-SOLEAU & TEHERANI, 1995
Pl. 1, figs 3-4.

Remarks: Similar to the *Cytherella persiensis* described by CRASQUIN-SOLEAU & TEHERANI (1995, see p. 32, pl. 1, figs 7-10) from Carnian beds of Zagros Mts. in Iran with valves flattening posterodorsally in ventral view, with slightly concave dorsal margin at the left valve in lateral view and with smooth valve surface. Dorsal and midventral overlap of the studied specimens is less distinct than that of the holotype.
Dimensions: L= 0.54-0.7 mm, H= 0.32-0.43 mm, L/H= 1.48-1.82
Occurrences: Balatonhenye, Barnag, Balaton Highland (Hungary): Carnian (Upper Triassic) (this paper).

Genus *Cytherelloidea* ALEXANDER, 1929
Type species: *Cythere (Cytherella) williamsoniana* JONES, 1849

Cytherelloidea unicostata BOLZ, 1970
Pl. 1, fig. 2.

1970 *Cytherelloidea unicostata* n. sp. – BOLZ, pp. 254-256, pl. 2, figs 31-33, text-fig. 6.
1973 *Cytherelloidea ? unicostata* BOLZ – KRISTAN-TOLLMANN, text-fig. 5/9.
?1992 *Cytherelloidea? unicostata* BOLZ, 1970 – DÉPÊCHE & CRASQUIN-SOLEAU, pl. 3, figs 1-2.

Remarks: Characteristic features are the valve surface ornamentation with a concentric ridge strongly developed anteriorly and posteriorly near the margins, a subcentral pit bounded by a longitudinal rib ventrally. The secondary ornamentation, the reticulation is indistinct because of the preservation potential of the carapace.
Dimensions: L=0.82 mm, H=0.44 mm, L/H=1.89.
Occurrences: Barnag, Rezi, Transdanubian Central Range (Hungary): Carnian to Rhaetian (Upper Triassic) (this paper); Northern Calcareous Alps, Zlambach beds (Austria): Norian to Raethian (Upper Triassic) (Bolz, 1970; KRISTAN-TOLLMANN, 1973).

Genus *Reubenella* SOHN, 1968
Type species: *Reubenella avnimelechi* SOHN, 1968

Reubenella picardi SOHN, 1968
Pl. 1, figs 5-6.

1968 *Reubenella picardi* n. sp. – SOHN, pp. 18-19, pl. 1, figs 27-32.
1983 *Reubenella picardi* Sohn – BASHA, pl. 2., figs 10-11.
1979 *Cytherelloidea picardi* (SOHN, 1968) – STYK, pp. 120-121, pl. 34, figs 5-7.
1982 *Cytherelloidea picardi* (SOHN, 1968) – STYK, pp. 18-19, pl. 1, figs 4-5.

Remarks: Characteristic features are the strong

polygonal reticulation on the valve surface and the presence of the rounded subcentral pit. Stubby and more elongate forms co-occurred in the samples. This fact can be explained by sexual dimorphism.
Dimensions: L=0.5-1.68 mm, H=0.31-0.39mm, L/H=1.61-1.97.
Occurrences: Poland: Anisian (Middle Triassic) (STYK, 1979, 1982); Makhtesh Ramon (Israel): Anisian to Ladinian (Middle Triassic) (SOHN, 1968); Jordan Valley (Jordan): Ladinian (Middle Triassic) (BASHA, 1983); Bakonykúti, E-Bakony, Balatonhenye, Barnag, Balaton Highland (Hungary): Ladinian to Carnian (Middle Triassic) (this paper).

Order Podocopida MÜLLER, 1894
Suborder Metacopina SYLVESTER-BRADLEY, 1961
Superfamily Healdiacea HARLTON, 1933
Family Healdiidae HARLTON, 1933
Subfamily Hungarellinae KRISTAN-TOLLMANN, 1971
Genus *Hungarella* MÉHES, 1911
Type species: *Bairdia*? *problematica* MÉHES, 1911

Hungarella problematica (MÉHES, 1911)
Pl. 1, figs 7-10.

1911 *Bairdia*? *problematica* n. sp. – MÉHES, pp. 20-21, pl. 3, figs 14-18.
2013 *Hungarella problematica* (MÉHES, 1911) – MONOSTORI & TÓTH, p. 308, pl. 4, figs 14-17. cum. syn.

Remarks: Overlap of the left valve and the length/height of the carapace ratio very variable. The carapace is more or less laterally compressed posteriorly, the posterior spine absent.
Dimensions: L= 0.47-0.83 mm, H= 0.24-0.56 mm, L/H=1.33-1.5.
Occurrences: Dobrogea (Romania): Anisian (Middle Triassic) (CRASQUIN SOLEAU & GRADINARU 1996); Barnag, Balatonhenye, Felsőörs, Katrabóca II, Litér quarry, Mencshely, Nosztori Valley, Balaton Highland (Hungary): Anisian to Carnian (Middle to Upper Triassic) (MEHES 1911; KOZUR 1970A; MONOSTORI 1995; MONOSTORI & TOTH, 2013; SZELES 1965; this paper).

Suborder Bairdiocopina SARS, 1866
Superfamily Bairdiocypridoidea SHAVER, 1961
Family Bairdiocyprididae SHAVER, 1961
Genus *Bairdiacypris* BRADFIELD, 1935
Type species: *Bairdiacypris deloi* BRADFIELD, 1935

Bairdiacypris triassica KOZUR, 1971
Pl. 1, fig. 12.

1971c *Bairdiacypris triassica* n. sp. – KOZUR, pp. 5-6, fig. 2H-L.
2013 *Bairdiacypris triassica* KOZUR, 1971 – MONOSTORI & TÓTH, p. 313-314, pl. 3, figs 7-8, 10. cum. syn.

Dimensions: L=0.68 mm, H=0.38 mm, L/H=1.78.
Remarks: The specimen fit into the large variation (convexity of the dorsal margin) of the species detected by MONOSTORI & TÓTH (2013) from Ladinian beds of Litér quarry in Balaton Highland.
Occurrences: Katrabóca II, Felsőörs, Litér quarry, Mencshely, Nosztori Valley, Balaton Highland (Hungary): Ladinian to Carnian (Middle to Upper Triassic) (MÉHES 1911; KOZUR 1971c; MONOSTORI & TÓTH 2013; this paper).

Superfamily Bairdioidea SARS, 1887
Family Bairdiidae SARS, 1887
Genus *Acratia* DELO, 1930
Type species: *Acratia typica* DELO, 1930

Acratia goemoeryi KOZUR, 1970
Pl. 1, fig. 11.

1970a *Acratia goemoeryi* n. sp. – KOZUR, p. 391, pl. 3, figs 10-11.
2013 *Acratia goemoeryi* KOZUR, 1970 – MONOSTORI & TÓTH, pp. 308-309, pl. 4, figs 1-2. cum. syn.

Remarks: The specimens with stubby shape occur in the studied material which fit into the large variation of the species detected by CRASQUIN-SOLEAU & GRADINARU (1996) from Anisian beds of Romania.
Dimensions: L=0.57 mm, H=0.26 mm, L/H=2.24.
Occurrences: Greece, Austria, Slovakia, Hungary and Himalaya: Lower Triassic (KOZUR 1971c); South Tibet (China): Spathian to Anisian (Lower to Middle Triassic) (FOREL et al. 2011); Dobrogea (Romania): Anisian (Middle Triassic) (CRASQUIN-SOLEAU & GRADINARU 1996); Felsőörs, Litér quarry, Balaton Highland (Hungary): Anisian to Ladinian (Middle Triassic) (KOZUR 1970a; 1972b; MONOSTORI 1995; MONOSTORI & TOTH, 2013); Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper).

Genus *Bairdia* MCCOY, 1844
Type species: *Bairdia curta* MCCOY, 1844

Bairdia (Urobairdia) angusta (KOLLMANN, 1963)
Pl. 1, fig. 13.

1963 *Urobairdia angusta* n. sp. – KOLLMANN, p. 167, pl. 6, figs 1-4.

2013 *Bairdia (Urobairdia*) *angusta* KOLLMANN, 1963 – MONOSTORI & TOTH, p. 309, pl. 1, figs 10-12. cum. syn.

Remarks: The studied specimens have identical outline with the specimens illustrated on figs 1-2. by KOLLMANN (1963).
Dimensions: L= 0.68-0.88 mm, H= 0.38-0.51 mm, L/H= 1.75-1.76.
Occurrences: Felsőörs, Litér quarry, Mencshely, Nosztori Valley, Balaton Highland (Hungary): Anisian to Carnian (Middle to Upper Triassic) (MONOSTORI 1995; MONOSTORI & TOTH, 2013; SZELES 1965, this paper); Northern Calcareous Alps (Austria): Norian (Upper Triassic) (KOLLMANN 1963).

Bairdia cassiana (REUSS, 1868)
Pl. 1, fig. 14.

1868 *Cythere Cassiana* n. sp. – REUSS, p. 108.
2013 *Bairdia cassiana* (REUSS, 1868) – MONOSTORI & TÓTH, p. 310, pl. 2, figs 7-8. cum. syn.

Remarks: The studied specimens with more pointed posterior end fit into the large variation of the species recognized by MONOSTORI & TÓTH (2013).
Dimensions: L= 0.72-0.88 mm, H= 0.39-0.49 mm, L/H= 1.79-1.83.
Occurrences: Dobrogea (Romania): Anisian (Middle Triassic) (CRASQUIN-SOLEAU & GRADINARU 1996); Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper); Southern Alps, Cassian Beds (Italy): Carnian (Upper Triassic) (REUSS 1868; GÜMBEL 1869; URLICHS 1970; KRISTAN-TOLLMANN 1978); Barnag, Felsőörs, Katrabóca II, Litér quarry, Mencshely, Balaton Highland (Hungary): Anisian to Carnian (Middle to Upper Triassic) (MONOSTORI 1995; MONOSTORI & TOTH, 2013, this paper).

Bairdia jeancharlesi FOREL, 2011
Pl. 2, figs 1-2.

2011 *Bairdia jeancharlesi* FOREL n. sp. – FOREL & CRASQUIN, pp. 250-251, fig. 3I-L.

Remarks: The most characteristic features are the straight dorsal, posterodorsal and anterodorsal margin at the right valve. The small punctations cannot be detected on the valve surface probably due to the preservation potential.
Dimensions: L= 0.92-1.21 mm, H= 0.52-0.71 mm, L/H= 1.7-1.86.
Occurrences: S-Tibet: Smithian to Anisian (Lower to Middle Triassic) (FOREL & CRASQUIN, 2011); Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper); Mencshely, Balaton Highland (Hungary): Carnian (Upper Triassic) (this paper).

Bairdia ex gr. *margosulcata* BOLZ, 1971
Pl. 1, fig. 15.

Remarks: In the studied material one damaged carapace can be found with similar outline and anteriorly similar fine denticles projecting beyond the periphery to *Bairdia margosulcata* described by BOLZ (1971, see pl. 6, pp. 174-175, figs 77-81.) from Norian to Rhaetian beds of Northern Calcareous Alps.
Dimensions: L=1.15 mm, H=0.72 mm, L/H= 1.59.
Occurrence: Rezi, Balaton Highland (Hungary): Norian to Rhaetian (Upper Triassic) (this paper).

Genus *Ceratobairdia* SOHN, 1954
Type species: *Ceratobairdia dorsospinosa* SOHN, 1954

Ceratobairdia crassispinosa n. sp.
Pl. 2, fig. 3.

2013 *Ceratobairdia longispinosa* KOZUR, 1971 – MONOSTORI & TÓTH, p. 314, Pl. 3, fig. 1.

Derivatio nominis: After its two stout spines on the dorsal margin.
Holotype: Left valve, Eötvös Museum of Natural History, EMNH 2014.208.7.8, figured pl. 2, fig. 3.
Locus typicus: borehole Bút-2.
Stratum typicum: 72.4 m, Ladinian.
Material: 2 valves.
Diagnosis: A species of *Ceratobairdia* with two strong and symmetrically arranged anterodorsal and posterodorsal spines which are directed forwards and backwards with an angle of 45° and have a broad basis. The valves are lipped anteroventrally and posteroventrally.
Description: The shape of the left valve trapezoidal; anterior margin slightly pointed, dorsally slightly concave or straight and ventrally convex and lipped; dorsal margin slightly convex bearing two strong and symmetrically arranged anterodorsal and posterodorsal spines which are directed forwards and backwards with an angle of 45° and have a broad basis; posterior margin pointed, dorsally slightly concave or straight and ventrally convex and lipped; ventral margin slightly sinuous; valve surface smooth.
Dimensions: L= 0.65 mm, H= 0.34 mm, L/H= 1.9.
Comparison: Similar to *Ceratobairdia longispinosa* KOZUR, 1971, but at the type

specimen described by KOZUR (1971a, pp. 4-5, fig. 1e) the basal part of the spines is not broad. The shape of the valve and the spines at the specimen described by MONOSTORI & TÓTH (2013) as *Ceratobairdia longispinosa* coincides in all details with that of the holotype.
Occurrence: Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper).

Genus *Dicerobairdia* KOLLMANN, 1963
Type species: *Dicerobairdia bicornuta* KOLLMANN, 1963

Dicerobairdia latispinosa n. sp.
Pl. 2, fig. 6.

Derivatio nominis: After its short spines with broad basis on the dorsal margin.
Holotype: Carapace, Eötvös Museum of Natural History, EMNH 2014.207.1.4, figured pl. 2, fig. 6.
Locus typicus: borehole Bat-2.
Stratum typicum: 64 m, Carnian.
Material: 2 carapaces.
Diagnosis: A species of *Dicerobairdia* with a larger anterodorsal and a smaller posterodorsal spine which have very broad base. The valve is thickened at the margins. The valve surface is densely reticulated.
Description: The shape of the right valve trapezoidal; anterior margin dorsally slightly straight and passes with a break to its convex ventral part; dorsal margin slightly convex bearing a larger anterodorsal and a smaller posterodorsal spine which have very broad base; posterior margin pointed upward, its dorsal part slightly concave and its ventral part convex; ventral margin slightly sinuous; valve surface densely reticulated and the valve thickened at the margins.
Dimensions: L= 0.99 mm, H= 0.5 mm, L/H= 1.99.
Comparison: Similar to *Dicerobairdia bicornuta* KOLLMANN, 1963 (KOLLMANN, 1963, see pp. 182-183, pl. 1, figs 3-8; pl. 9, figs 1-2) from Rhaetian beds of Northern Calcareous Alps but Kollmann's specimen has more distinct spines situated less marginally than that of the holotype.
Occurrence: Barnag, Balaton Highland (Hungary): Carnian (Upper Triassic) (this paper).

Genus *Hiatobairdia* KRISTAN-TOLLMANN, 1970
Type species: *Hiatobairdia subsymmetrica* KRISTAN-TOLLMANN, 1970

Hiatobairdia subsymmetrica KRISTAN-TOLLMANN, 1970
Pl. 2, figs 4-5.

1970 *Hiatobairdia subsymmetrica* n. sp. – KRISTAN-TOLLMANN, pp. 286-287, pl. 35, figs 1-3.
1978 *Hiatobairdia subsymmetrica deformis* n. ssp. – KRISTAN-TOLLMANN, pp. 83-84, figs 1-7.
1980 *Hiatobairdia subsymmetrica* KRISTAN-TOLLMANN, 1970 – KRISTAN-TOLLMANN et. al., p. 179, pl. 9, figs 1-3.
1988 *Hiatobairdia subsymmetrica* KRISTAN-TOLLMANN – KRISTAN-TOLLMANN, text-fig. 6/2.

Remarks: Characteristic features are the subsymmetrical outline with slightly elongate angular ends and the valve surface ornamented with fine pits.
Dimensions: L= 0.85-1.05 mm, H= 0.42-0.58 mm, L/H= 1.8-2.1.
Occurrences: Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper); Barnag, Balaton Highland (Hungary): Carnian (Upper Triassic) (this paper); Dolomites, S-Tirol (Italy): Carnian (Upper Triassic) (Kristan-Tollmann, 1978); Zagros Mountains (Iran): Rhaetian (KRISTAN-TOLMANN et al. 1980; KRISTAN-TOLLMANN, 1988), Northern Calcareous Alps (Austria): Raethian (KRISTAN-TOLLMANN, 1970); Rezi, Balaton Highland (Hungary): Norian to Rhaetian (this paper).

Genus *Triebelina* BOLD, 1946
Type species: *Triebelina indopacifica* BOLD, 1946

Triebelina (*Mirabairdia*) *pernodosa* (KOLLMANN, 1963)
Pl. 2, figs 7-8.

1963 *Mirabairdia pernodosa* n. sp. – KOLLMANN, p. 177-178, pl. 1, figs 1-2, pl. 8, figs 1-6.
1971a *Triebelina* (*Mirabairdia*) *pernodosa illyrica* n. spp. – KOZUR, p. 17, fig. 1G.
1971a *Triebelina* (*Mirabairdia*) *balatonica* n. sp. – KOZUR, p. 15-16, figs 2I, 3C.
1971 *Mirabairdia pernodosa* KOLLM. – KRISTAN-TOLLMANN, text-fig 1/8.
1984 *Triebelina* (*Mirabairdia*) *pernodosa illyrica* KOZUR – SALAJ & JENDREJÁKOVÁ, pl. 2, figs 1-4.

Remarks: Characteristic features are the fine granular polygonal reticulation and the two or three nodes arranged in regular horizontal raw anterodorsally, anteroventrally, posterodorsally, and posteroventrally and in two vertical rows subcentrally on the valve surface. The nodes at the margins can be subdivided into smaller spines instead of the presence one distinct node. The position of the nodes can be changed on the valve surface. The posterior end bears denticles in most cases. Because of the large morphological variation of the ornamentation of *Triebelina*

(*Mirabairdia*) *pernodosa*, the justification of the subspecies *Triebelina* (*Mirabairdia*) *pernodosa illyrica* KOZUR, 1971 and of the species *Triebelina* (*Mirabairdia*) *balatonica* KOZUR, 1971 is questionable.
Dimensions: L= 0.84-1.13 mm, H= 0.43-0.69 mm, L/H= 1.56-2.13.
Occurrences: Western Carpathians (Slovakia): Anisian (Middle Triassic) (SALAJ & JENDREJAKOVA, 1983; KOZUR, 1971a); Balaton Highland (Hungary): Anisian (Middle Triassic) (KOZUR, 1971a); Dolomites, S-Tirol, Italy: Ladinian (Middle Triassic) (KRISTAN-TOLLMANN, 1971); Northern Calcareous Alps, Cassian beds (Austria): Ladinian (Middle Triassic) (KOLLMANN 1963); Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper).

Triebelina (*Nodobairdia*) *mammilata*
(KOLLMANN, 1963)
Pl. 2, figs 9-10.

1963 *Nodobairdia mammilata* n. sp. – KOLLMANN, pp. 174-175, pl. 7, figs 6-15.
1973 ?*Nodobairdia mammilata* KOLLMANN – KRISTAN-TOLLMANN in KRISTAN-TOLLMANN & HAMEDANI, textfig. 12/9.
1994 *Nodobairdia mammilata* KOLLMANN, 1963 – MONOSTORI, pp. 316, 318, text-fig. 4/3. cum. syn.

Remarks: Characteristic features are the granular valve surface ornamentation and the presence of granular nodes at the anterodorsal, posterodorsal, anterior and posterior margins and the distinct ventral ridge which sometimes subdivided into nodes. There are additional small nodes on the valve surface.
Dimensions: L= 0.74-0.8 mm, H= 0.41-0.46 mm, L/H= 1.73-1.81.
Occurrences: Northern Calcareous Alps, Cassian beds (Austria): Ladinian (Middle Triassic) (KOLLMANN 1963); Dolomites, S-Tirol (Italy): Ladinian to Carnian (Middle to Upper Triassic) (KRISTAN-TOLLMANN 1971, 1978); Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper); Zsámbék, Gerecse (Hungary): Carnian (Upper Triassic) (KRISTAN-TOLLMANN et al. 1991); Barnag, Nosztori Valley, Rezi, Balaton Highland (Hungary): Carnian to Rhaetian (Upper Triassic) (MONOSTORI 1994, this paper); Zagros Mountains (Iran): Rhaetian (Upper Triassic) (KRISTAN-TOLLMANN et al. 1980; KRISTAN-TOLLMANN 1988).

Triebelina (*Ptychobairdia*) *kuepperi* (KOLLMANN, 1960)
Pl. 2, figs 12-13.

1960 *Ptychobairdia kuepperi* n. sp. – KOLLMANN, pp. 97-98, pl. 24, figs 1-5., pl. 25, figs 2-5, text-fig. 2ab.
1969 *Ptychobairdia kuepperi* KOLLMANN – KRISTAN-TOLLMANN, p. 84, pl. 1, figs 4-5.
1971 *Triebelina* (*Ptychobairdia*) *kuepperi* (KOLLMANN, 1960) – BOLZ, pp. 199-205, pl. 10, figs 141-154, pl. 11-14, figs 155-207, text-figs 27-29.
1971 *Ptychobairdia kuepperi* KOLLM. – KRISTAN-TOLLMANN, text-fig. 1/2.
1972b *Triebelina kuepperi* – KOZUR, pl. 2, fig. 1.

Remarks: The studied specimens with more or less developed dorsal and ventral ribs fit into the large variation of the species detected by BOLZ (1971) from Upper Triassic Zlambach beds of Northern Calcareous Alps.
Dimensions: L= 0.96-1.05 mm, H= 0.51-0.58 mm, L/H=1.8-1.86.
Occurrences: Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper); Barnag, Balaton Highland (Hungary): Carnian (Upper Triassic) (this paper); Northern Calcareous Alps (Austria): Norian to Raethian (KOLLMANN, 1960; BOLZ, 1971; KRISTAN-TOLLMANN, 1969, 1971).

Triebelina (*Ptychobairdia*) *circumvallata*
(KRISTAN-TOLLMANN, 1969)
Pl. 2, fig. 11.

1969 *Ptychobairdia circumvallata* n. sp. – KRISTAN-TOLLMANN, pp. 85-86, pl. 2, figs 6-10.
1971 *Triebelina (Ptychobairdia) circumvallata* (KRISTAN-TOLLMANN, 1969) – BOLZ, pp. 205-207, pl. 14, figs 208-214, text-fig. 1f.
1972b *Triebelina circumvallata* – KOZUR, pl. 2, fig. 5.

Remarks: In the studied material one single poorly preserved carapace can be found with similar outline to the holotype and with the presence of the very characteristic concentrical peripheral distinct ridge.
Dimensions: L= 1.04 mm, H= 0.58, L/H= 1.79.
Occurrences: Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper); Northern Calcareous Alps, Zlambach beds (Austria): Norian to Raethian (BOLZ, 1971; KRISTAN-TOLLMANN, 1969).

Suborder Cypridocopina BAIRD, 1845
Superfamily Cypridoidea BAIRD, 1845
Family Paracyprididae SARS, 1923
Genus *Paracypris* SARS, 1866
Type species: *Paracypris polita* SARS, 1866

Paracypris sp.
Pl. 3, figs 1-2.

Remarks: Diagnostic features are the elongate subtriangular shape which tapers toward the very narrowly arched posterior end; the symmetrically rounded anterior margin; the straight or slightly concave posterodorsal margin; the slightly and symmetrically concave ventral margin and the smooth valve surface. The outline of the specimens is identical with that of *Paracypris* sp. 2. described by MONOSTORI (1994) from Carnian beds of Balaton Highland.
Dimensions: L= 0.59-0.65, H= 0.27-0.3 mm, L/H= 2.16-2.17.
Occurrence: Barnag, Nosztori Valley, Balaton Highland (Hungary): Carnian (Upper Triassic) (MONOSTORI 1994; this paper).

Suborder Cytherocopina BAIRD, 1850
Superfamily Cytheroidea BAIRD, 1850
Family Cytheruridae SARS, 1925
Subfamily Cytherurinae SARS, 1925
Genus *Judahella* SOHN, 1968
Type species: *Judahella tsorfatia* SOHN, 1968

Judahella fortenodosa (URLICHS, 1972)
Pl. 3, figs 3-4.

1972 *Monoceratina fortenodosa* n. sp. – URLICHS, p. 678, pl. 1, figs 6-8.
1980 *Monoceratina fortenodosa* URLICHS, 1973 – KRISTAN-TOLLMANN in KRISTAN-TOLLMANN et al., p. 187, pl. 8, fig. 10.
1988 *Triceratina fortenodosa* (URLICHS) – KRISTAN-TOLLMANN, text-fig. 6/10.
1991 *Triceratina fortenodosa* (URLICHS, 1972) – KRISTAN-TOLLMANN et al., pl. 8, figs 1-2.

Remarks: Diagnostic features are four dorsal, two anteroventral and one posteroventral nodes, a median furrow and a posteroventral spine. Because of the poor preservation potential the fine polygonal reticulation pattern cannot be recognized on the valve surface of the studied specimens.
Dimensions: L=0.52-0.54 mm, H= 0.21-0.22 mm, L/H= 2.31-2.5.
Occurrences: Bakonykúti, E-Bakony (Hungary): Ladinian (Middle Triassic) (this paper); Northern Calcareous Alps, Cassian beds (Austria): Norian (Upper Triassic) (URLICHS 1972; KRISTAN-TOLLMANN et al. 1991); Zagros Mountains (Iran): Rhaetian (Upper Triassic) (KRISTAN-TOLLMANN et al. 1980; KRISTAN-TOLLMANN 1988).

Genus *Kerocythere* KOZUR & NICKLAS, 1970
Type species: *Cythere raibliana* GÜMBEL, 1869

Kerocythere cf. *reticulata* KRISTAN-TOLLMANN, 1972
Pl. 3, figs 5-7.

Remarks: Similar to *Kerocythere reticulata* described by KRISTAN-TOLLMANN (1972, p. 46, pl. 2, figs 4-5.) from Carnian beds of Julian Alps (Italy).
Dimensions: L= 0.71-0.74 mm, H=0.36-0.42 mm, L/H= 1.75-2.
Occurrence: Barnag, Balatonhenye, Balaton Highland (Hungary): Carnian (Upper Triassic) (this paper).

Kerocythere veghae KOZUR, 1971
Pl. 3, figs 8-9.

1971 *Kerocythere veghae* n. sp. – KOZUR in BUNZA & KOZUR, pp. 49-51, pl. 4, figs 17-19.
1994 *Kerocythere veghae* KOZUR, 1971 – MONOSTORI, pp. 319-320. cum syn.

Remarks: The median ridge is weaker than that of the holotype. This phenomenon is linked to intraspecific variability.
Dimensions: L= 0.77-0.8 mm, H= 0.5-0.55 mm, L/H= 1.55-1.6.
Occurrences: Julian Alps (Italy): Carnian (Upper Triassic) (KRISTAN-TOLLMANN 1972; LIEBERMAN 1979); Veszprém Plateau (Hungary): Carnian (Upper Triassic) (BUNZA & KOZUR 1971); Northern Calcareous Alps (Austria): Carnian (Upper Triassic) (KRISTAN-TOLLMANN & HAMEDANI 1973), Balataonhenye, Balaton Highland (Hungary): Carnian (Upper Triassic) (this paper).

Family undetermined
Genus *Renngartenella* SCHNEIDER, 1957
Renngartenella sanctaecrucis KRISTAN-TOLLMANN, 1973
Pl. 3, figs 10-12.

1973 *Renngartenella sanctaecrucis* n. sp. – KRISTAN-TOLLMANN in KRISTAN-TOLLMANN & HAMEDANI, pp. 215-219, text-fig. 8/1-6, text-fig. 11.
1983 *Renngartenella sanctaecrucis* TOLLMANN & HAMEDANI – BASHA, pl. 1, fig. 15.
1994 *Renngartenella sanctaecrucis* KRISTAN-TOLLMANN, 1973 – MONOSTORI, pp. 320-321, text-fig. 5/5-7. cum. syn.

Remarks: Characteristic features are the polygonal reticulation pattern, the distinct median sulcus and the main swellings. The males are often more elongate than females.
Dimensions: L= 0.49-0.55 mm, H= 0.29-031 mm, L/H= 1.62-1.89.

Occurrences: Northern Calcareous Alps (Austria): Carnian (Upper Triassic) (KRISTAN-TOLLMANN & HAMEDANI 1973); Julian Alps (Italy): Carnian (Upper Triassic) (LIEBERMAN 1979); Jordan Valley (Jordan): Carnian (Upper Triassic) (BASHA 1983); Makhtesh Ramon (Israel): Carnian (Upper Triassic) (GERRY et al. 1990); Balatonhenye, Barnag, Nosztori Valley, Balaton Highland (Hungary): Carnian (Upper Triassic) (MONOSTORI 1994; this paper).

Genus *Simeonella* SOHN, 1968
Type species: *Simeonella brotzenorum* SOHN, 1968

Simeonella brotzenorum SOHN, 1968
Pl. 3, figs 13-15.

1968 *Simeonella brotzenorum* n. sp. – SOHN, pp. 23-24, pl. 2, figs 1-4, 6-8, 12-22.
1971 *Simeonella brotzenorum alpina* n. ssp. – BUNZA & KOZUR, pp. 4-5, pl. 1, figs 5-7, 13.
1971 *Simeonella brotzenorum norica* n. ssp. – BUNZA & KOZUR, pp. 5-6, pl. 1, fig. 3.
1973 *Simeonella brotzenorum* SOHN – KRISTAN-TOLLMANN in KRISTAN-TOLLMANN & HAMEDANI, text-fig. 13/2.
1974 *Simeonella brotzenorum* SOHN – HIRSCH & GERRY, pl. 2, figs 1-2.
1979 *Simeonella brotzenorum* SOHN, 1968 – LIEBERMAN, p. 103, pl. 5., figs 6-7.
1979 *Simeonella brotzenorum alpina* BUNZA et KOZUR – STYK, p. 119, pl. 28, figs 9-10.
1983 *Simeonella brotzenorum* SOHN – BASHA, pl. 1, fig. 11.
1990 *Simeonella brotzenorum* SOHN, 1968 – GERRY et al., p. 95, pl. 1, figs 3-5.
1994 *Simeonella brotzenorum nostorica* n. ssp. – MONOSTORI, pp. 324-325, text-fig. 6/1-6.

Remarks: Characteristic features are the small subquadrate shape, and the reticulation forming horizontally trending riblets. Because of the large morphological variation of *Simeonella brotzenorum*, the justification of the subspecies described by BUNZA & KOZUR (1971) and MONOSTORI (1994) is questionable.
Dimensions: L= 0.42-0.46 mm, H= 0.27-0.34 mm, L/H= 1.35-1.6.
Occurrences: Makhtesh Ramon (Israel): Ladinian to Carnian (Upper Triassic) (SOHN 1968; HIRSCH & GERRY 1974; GERRY et al. 1990); Northern Calcareous Alps (Austria): Carnian (Upper Triassic) (BUNZA & KOZUR 1971; KRISTAN-TOLLMANN & HAMEDANI 1973); Julian Alps (Italy): Carnian (Upper Triassic) (LIEBERMAN 1979); Jordan Valley (Jordan): Carnian (Upper Triassic) (BASHA 1983); Balatonhenye, Barnag, Nosztori Valley, Balaton Highland (Hungary): Carnian (Upper Triassic) (MONOSTORI 1994; this paper); Poland: Carnian (Upper Triassic) (STYK 1979).

Simeonella reissi SOHN, 1968
Pl. 3, fig. 16.

1968 *Simeonella reissi* n. sp. – SOHN, p. 24, pl 1, figs 1-5, 8-12.
1983 *Simeonella reissi* SOHN – BASHA, pl. 2, 3-5.

Remarks: Characteristic features are the fine reticulation pattern on the valve surface and the weak ribs dorsally and ventrally.
Dimensions: L= 3.25-4.34 mm, H= 0.21-0.32 mm, L/H= 1.4-1.44.
Occurrences: Makhtesh Ramon (Israel): Carnian (Upper Triassic) (SOHN 1968); Jordan Valley (Jordan): Carnian (Upper Triassic) (BASHA 1983); Balatonhenye, Balaton Highland (Hungary): Carnian (Upper Triassic) (this paper).

Characteristics and palaeoecological significance of Ladinian to Carnian ostracoda faunas from the Transdanubian Central Range

Middle to Upper Triassic deposits in the studied boreholes (Bat-2, Bht-6, Bút-2, Met-1, and Rzt-1) are characterized by poorly to moderately preserved podocopid ostracod faunas beside few reticulated polycopids in borehole Bút-2. Due to the poor to moderate preservation potential the specimens could be determined only on genus level in most cases. Two new species could be established namely *Ceratobairdia crassispinosa* n. sp. from the Ladinian beds of the borehole Bút-2 and *Dicerobairdia latispinosa* n. sp. from Carnian beds of the borehole Bat-2. The majority of the identified taxa were known only from the Middle to Upper Triassic. Only the species *Acratia goemoeryi* and *Bairdia jeancharlesi* occur in Lower Triassic section of South Tibet (FOREL & CRASQUIN 2011; FOREL et al. 2011). Relatively long ranges of the Triassic ostracod taxa and their distribution depending on the facies have made them not so good index fossils but they are very useful palaeoenvironmental indicators. The palaeoecological interpretation of the studied faunas is discussed in stratigraphical order.

In the studied Ladinian sections of the Buchenstein Formation in the borehole Bút-2 there are relatively diverse ostracod fauna with great abundance of the specimens. The distribution in faunal composition of ostracods in each bed is very similar; there is no significant trend in the changes of diversity and in the ratio of different taxa. The association of the studied benthic fauna, the dominance of ornamented bairdioids (*Ceratobairdia, Hiatobairdia* and *Triebelina*), the presence of *Reubenella* and the stubby *Acratia* suggests neritic, normal marine, middle sublittoral depositional environment with moderate water energy. The studied ostracod fauna from the E-Bakony is absolutely different from the Ladinian assemblages derived from pelagic limestone beds of the Buchenstein Formation in the Litér quarry of the Balaton Highland (MONOSTORI & TÓTH, 2013). The latter fauna characterized by the dominance of the smooth bairdioids, metacopids and Thuringian-type elements (sensu BECKER in BANDEL & BECKER, 1975) indicates open marine, more than 200 m deep, oligotrophic, low energy conditions. This phenomenon is explained by the different palaeogeographical position of the studied areas. During the Ladinian age the succession of the Litér quarry was formed in the so-called „Balaton Highland Basin", whereas the deposits of the borehole Bút-2 in a proximal position to the „Budaörs Platform" (HAAS & BUDAI, 1995).

In the boreholes Met-1 and Bat-2, the Upper Ladinian to Carnian ostracod assemblages in the series of the Füred Limestone and the Veszprém Marl are represented by poorly preserved specimens in very low abundance. The characteristic elements of the faunas are the smooth bairdioids including the subgenus *Urobairdia* with narrow pointed posterior end, the smooth metacopids (*Hungarella*), the cytherellid *Reubenella* and bairdicypridoids. The composition of the fauna with the absence of typical shallow water ostracods (e.g, cytheroids or ornamented bairdioids) suggests normal marine deep sublittoral low energy conditions.

The younger part of the Carnian series in the boreholes Bat-2 and Bht-6 belongs to the Sándorhegy Formation. The ostracod faunas derived from thin grey marly limestone beds in Bat-2 (162.5 to113.2 m) and from one sample (121.7 m) of the Bht-6 are represented by the predominance of the specimens belonging to three genera (*Renngartenella, Simeonella* and *Kerocythere*) as a signal of increasing variability of the salinity in marginal marine settings. Moreover, the sedimentological characteristics in borehole Bat-2, the bituminous laminated grey marly layers with fish scales supposed stratified water column with low oxygenated conditions in this shallow marine environment. Similar Carnian ostracod assemblages were described by MONOSTORI (1994) from the Nosztori Valley in Balaton Highland, by LIEBERMAN (1979) in Julian Alps of northern Italy, by SOHN (1968), HIRSCH & GERRY (1974), GERRY et al. (1990) from Israel. Thus this salinity crisis can be considered as widespread in the Western Tethys. The Upper Carnian ostracod faunas of the Sándorhegy Limestone in the borehole Bat-2 with the re-appearance and dominance of ornamented bairdioids (*Triebelina* and *Dicerobairdia*) and cytherellids indicate the stabilization of the well oxygenated, normal marine conditions with shallow sublittoral water depth. These palaeoenvironmental changes during the Carnian age detected by the ostracod faunas can be explained by sea-level fluctuations. The above-mentioned salinity crisis is caused by a regressive event which was well correlates to a global sea-level lowstand (GERRY et al. 1990).

Norian to Rhaetian beds of the Kössen Formation in Rzt-1 provided poorly preserved and few mostly undetermined ostracod specimens. The identified taxa belonging to the ornamented bairdioids (*Triebelina* and *Hiatobairdia*) which indicate probably shallow marine environment, however the poor fauna is not suitable for reliable palaeoecological interpretation.

Conclusions

Relatively diverse, moderately and poorly preserved Ladinian to Rhaetian ostracod faunas were described from five boreholes (Bat-2, Bht-6, Bút-2, Met-1 and Rzt-1) of the Transdanubian Central Range. Detailed systematic descriptions are given for 25 ostracod taxa (with 2 new species) belonging to 17 genera, 8 families, 6 suborders (Cladocopina, Platycopina, Metacopina, Bairdiocopina, Cypridocopina and, Cytherocopina) and three orders (Halocyprida, Platycopida and, Podocopida). Based on the palaeoecological interpretation of the ostracod faunas the following marine palaeoenvironments could be distinguished in this region of the Tethys:

– In the Ladinian deposits of the borehole Bút-2 the dominance of ornamented bairdioids beside *Reubenella* and stubby *Acratia* indicates shallower (middle sublittoral) normal marine depositional environment of the Buchenstein Formation in the E-Bakony than it was detected based on the ostracod studies derived from Ladinian series of Litér quarry in the Balaton Highland.

– The studied Upper Ladinian to Carnian ostracod assemblages with smooth bairdioids (e.g., *Urobairdia*), metacopids, bairdio-cypridoids and cytherellids (*Reubenella*) in the boreholes Met-1 and Bat-2 suggest normal marine, deep sublittoral depositional environment of the Füred Limestone and the Veszprém Marl with low energy conditions.
– The Carnian salinity crisis caused by a regressive event could be recognized based on the predominance of the specimens of *Renngartenella, Simeonella* and *Kerocythere* in the faunal compositon of the boreholes Bat-2 and Bht-6. After this event, the re-appearance of the shallow sublittoral faunal elements (ornamented bairdioids) in the upper part of the Carnian series in the borehole Bat-2 proved the stabilization of normal marine conditions.
– The Norian to Rhaetian, poor faunas of the Kössen Formation in the borehole Rzt-1 supposed probably shallow marine environment based on the presence of the genera *Triebelina* and *Hiatobardia*.

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Locality	Bht-6						Bat-2															
Formation	S. Fm.	Veszprém Marl Fm.					Sándorhegy Fm.															V. M. Fm.
Member	P. M.	Csicsó Member					Barnag Member							Pécsely Member								Cs. M.
Sample	121.7 m	153.3 m	165.5 m	195.5 m	197 m	200 m	17.9 m	42.5 m	43.7 m	47.8 m	58.8 m	64 m	64.5 m	88.6 m	89.2 m	90 m	113.2 m	115.6 m	119.6 m	121.6 m	162.5 m	180.8 m
Cytherella cf. *persiensis*		2	6	~ 30	17	16	1	2	15	200<	6		14		5	50<						
Cytherelloidea unicostata													2									
Reubenella picardi	1	1	1		2							1		44								
Hungarella problematica				42	3	24				2												
Bairdia cassiana									2			1	15	1								
Dicerobairdia latispinosa												1	1									
Hiatobairdia subsymmetrica													1									
Triebelina (*Nodobairdia*) *mammilata*												7	11			1						
Triebelina (*Ptychobairdia*) *kuepperi*													1									
Paracypris sp.										15			1									2
Kerocythere cf. *reticulata*	250<															1						
Kerocythere veghae	150<																					
Renngartenella sanctaecrucis	8000<							1								1	50<	50<	18	17	2	
Simeonella brotzenorum	~ 400																				1	
Simeonella reissi	8000<																					

Appendix 1. - Quantitative data (number of specimens) of Carnian ostracod taxa from each sample from the studied boreholes Bat-2 and Bht-6. Abbreviations: S. Fm.= Sándorhegy Formation, P. M.= Pécsely

Locality	**Bút-2**							**Met-1**														**Rzt-1**		
Age	Ladinian							Carnian														Norian/ Rhaetian		
Formation	?	Buchenstein Fm.						Veszprém Marl Fm./Csicsó Member								Veszprém Marl Fm./Mencshely Marl M.				F. L.		K. Fm.		
Sample	72.4 m	93.2 m	95.2 m	96.6 m	99.3 m	99.9 m	100.2 m	31 m	51.3 m	52.2 m	56.8 m	57.8 m	58.3 m	60.2 m	62.1 m	170.7 m	173.9 m	177.7 m	178.7 m	435.6m		58.5 m	125.6 m	184 m
Polycope aff. *aghdarbandensis*			1																					
Cytherelloidea unicostata							3																1	
Reubenella picardi	2	15	5	1	14	2							1											
Hungarella problematica		30								1	11					1	7	1	1	7				
Bairdiacypris triassica								1	1	1	10				2			1		1				
Acratia goemoeryi	2	2	2																					
Bairdia (Urobairdia) angusta										4	10		3											
Bairdia cassiana		24	15	15	8		2			1									5					
Bairdia jeancharlesi		1	3	1										5										
Bairdia ex gr. margosulcata																							1	
Ceratobairdia crassispinosa	2																							
Hiatobairdia subsymmetrica		1	1																					1
Triebelina (Nodobairdia) mammilata	2	2	4			3	4															1		
Triebelina (*Mirabairdia*) *pernodosa*	11	26	33	19	13		8																	
Triebelina (*Ptychobairdia*) *circumvallata*							1																	
Triebelina (*Ptychobairdia*) *kuepperi*			11	13																				
Judahella fortenodosa	1	10																						

Member, V. M.= Veszprém Marl, Cs. M.= Csicsó Marl.

Appendix 2. - Quantitative data (number of specimens) of Ladinian to Rhaetian ostracod taxa from each sample from the studied boreholes Bút-2, Met-1 and Rzt-1. Abbreviations: F. L.= Füred Limestone, K. Fm.= Kössen Formation.

Plate 1

Fig. 1. *Polycope* aff. *aghdarbandensis* KRISTAN-TOLLMANN, 1991. RV in lateral view. Borehole Bút-2: 95.2 m

Fig. 2. *Cytherelloidea unicostata* BOLZ, 1970. RV in lateral view. Borehole Rzt-1: 125.6 m

Figs 3-4. *Cytherella* cf. *persiensis* CRASQUIN-SOLEAU & TEHERANI, 1995.
Fig. 3. RV in lateral view. Borehole Bat-2: 42.5 m
Fig. 4. C in left view. Borehole Bat-2: 89.2 m

Figs 5-6. *Reubenella picardi* SOHN, 1968.
Fig. 5. C in righ view. Borehole Bht-6: 121.7 m
Fig. 6. LV in lateral view. Borehole Bút-2: 96.6 m

Figs 7-10. *Hungarella problematica* (MÉHES, 1911).
Fig. 7. C in left view. Borehole Bht-6: 197.0 m
Fig. 8. C in dorsal view. Borehole Bht-6: 195.5 m
Fig. 9. C in left view. Borehole Bht-6: 200 m
Fig. 10. C in dorsal view. Borehole Bht-6: 195.5 m

Fig. 11. *Acratia goemoeryi* KOZUR, 1970. LV in lateral view. Borehole Bút-2: 72.4 m

Fig. 12. *Bairdiacypris triassica* KOZUR, 1971. C in right view. Borehole Met-1: 435.6 m

Fig. 13. *Bairdia (Urobairdia) angusta* (KOLLMANN, 1963). C in right view. Borehole Met-1: 56.8 m

Fig. 14. *Bairdia cassiana* (REUSS, 1868). LV in lateral view. Borehole Bút-2: 93.2 m

Fig. 15. *Bairdia* ex gr. *margosulcata* BOLZ, 1971. C in right view. Borehole Rzt-1: 125.6 m

Scale bar = 100 µm. Abbreviations: C = Carapace, RV = Right valve, LV = Left valve.

Plate 1

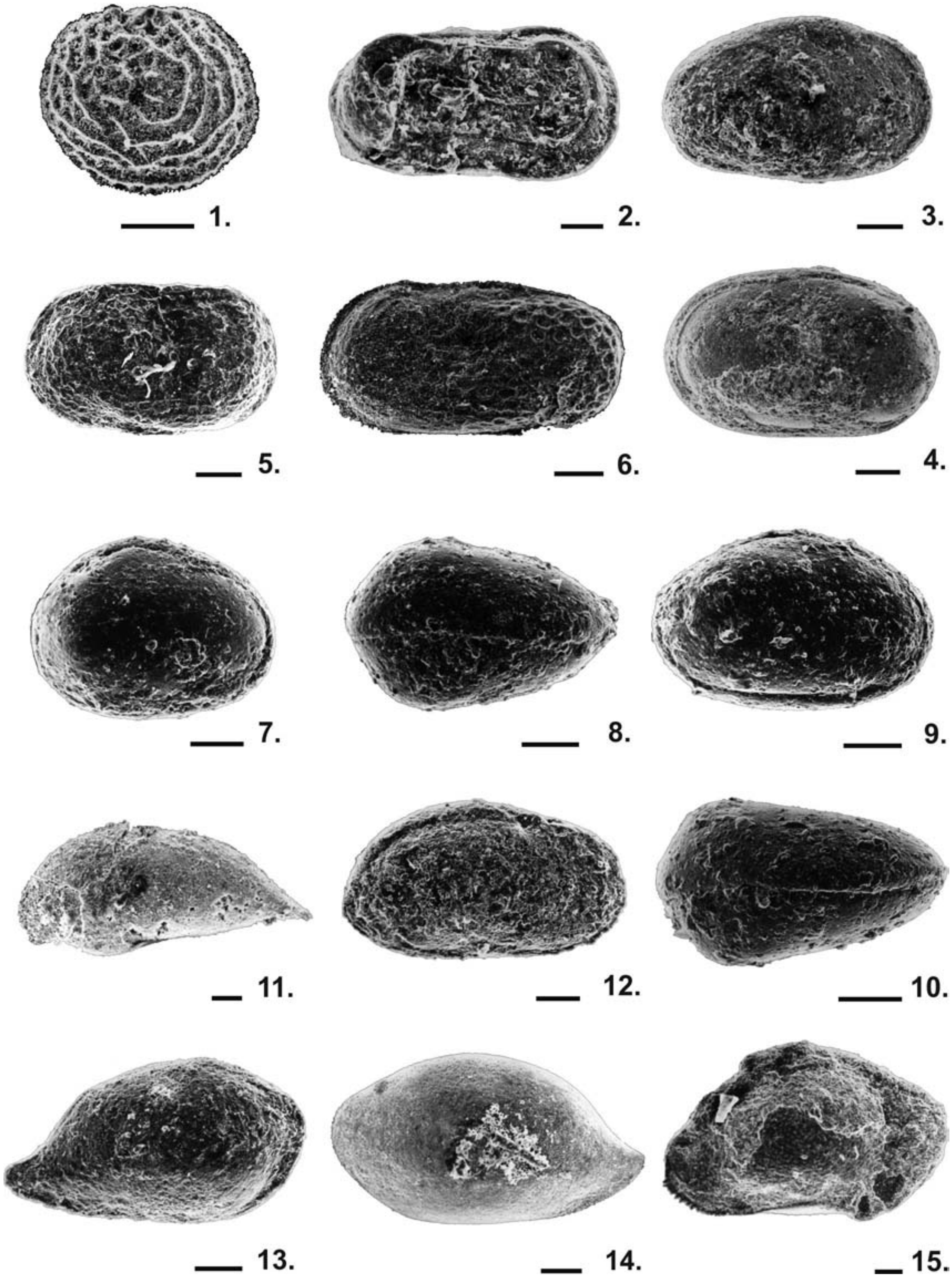

Plate 2

Figs 1-2. *Bairdia jeancharlesi* FOREL, 2011.
Fig. 1. LV in lateral view. Borehole Bút-2: 95.2 m
Fig. 2. RV in lateral view. Borehole Bút-2: 96.6 m

Fig. 3. *Ceratobairdia crassispinosa* n. sp. LV in lateral view. Borehole Bút-2: 72.4 m. EMNH 2014.207.7.8.

Figs 4-5. *Hiatobairdia subsymmetrica* KRISTAN-TOLLMANN, 1970.
Fig. 4. RV in lateral view. Borehole Rzt-1: 184 m
Fig. 5. RV in lateral view. Borehole Bút-2: 96.6 m

Fig. 6. *Dicerobairdia latispinosa* n. sp. C in right view. Borehole Bat-2: 64.0 m EMNH 2014.208.1.4.

Figs 7-8. *Triebelina (Mirabairdia) pernodosa* (KOLLMANN, 1963).
Fig. 7. RV in lateral view. Borehole Bút-2: 96.6 m
Fig. 8. LV in lateral view. Borehole Bút-2: 95.2 m

Figs 9-10. *Triebelina (Nodobairdia) mammilata* (KOLLMANN, 1963).
Fig. 9. RV in lateral view. Borehole Bat-2: 64.0 m
Fig. 10. LV in lateral view. Borehole Bat-2: 64.0 m

Fig. 11. *Triebelina (Ptychobairdia) circumvallata* (KRISTAN-TOLLMANN, 1969). RV in lateral view. Borehole Bút-2: 100.2 m

Figs 12-13. *Triebelina (Ptychobairdia) kuepperi* (KOLLMANN, 1960)
Fig. 12. RV in lateral view. Borehole Bat-2: 64 m
Fig. 13. RV in lateral view. Borehole Bút-2: 96.6 m

Scale bar = 100 µm. Abbreviations: C = Carapace, RV = Right valve, LV = Left valve.

Plate 3

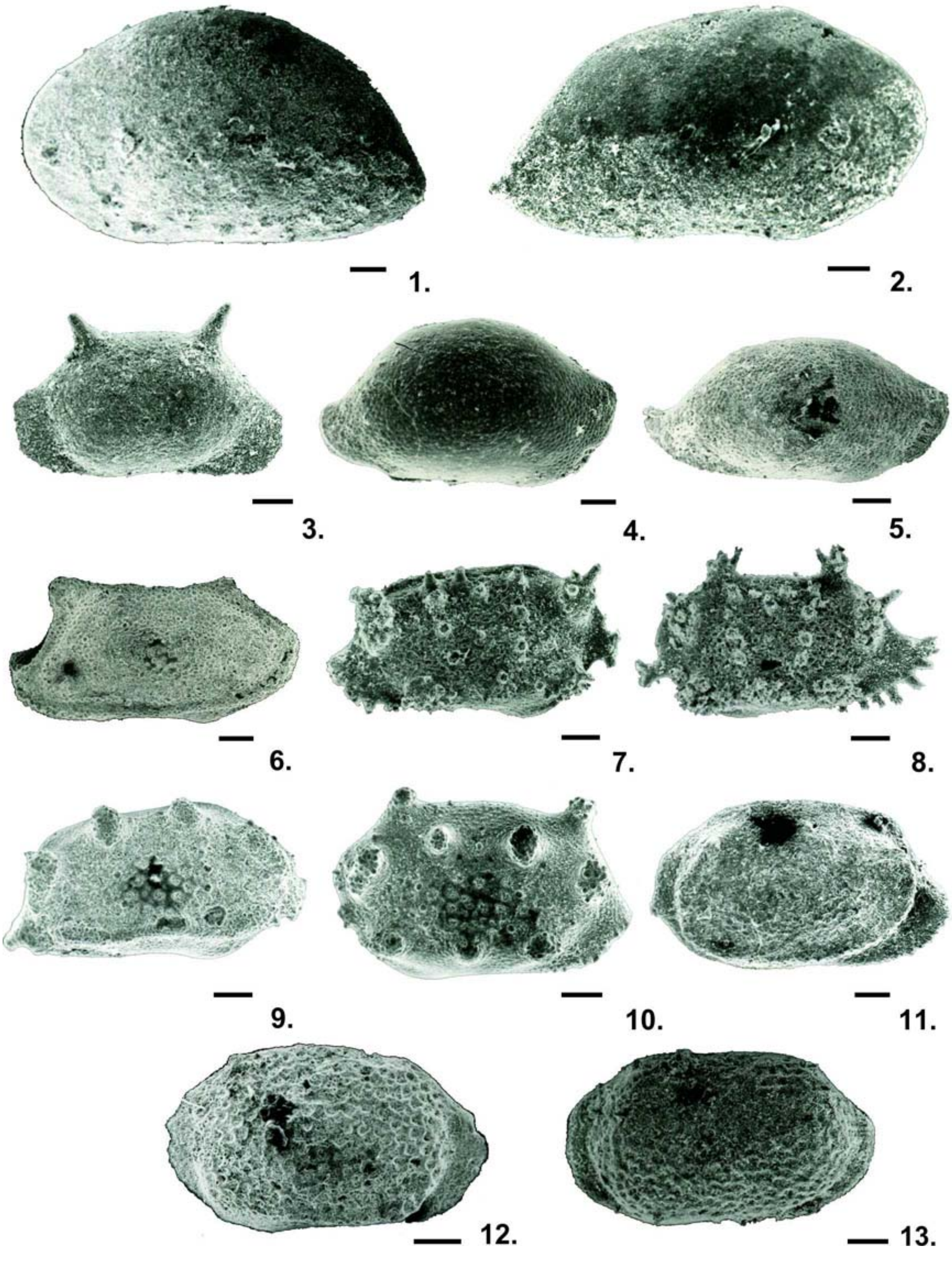

Plate 3

Figs 1-2. *Paracypris* sp.
Fig. 1. C in right view. Borehole Bat-2: 180.8 m
Fig. 2. LV in lateral view. Borehole Bat-2: 180. 8 m

Figs 3-4. *Judahella fortenodosa* (URLICHS, 1972)
Fig. 3. RV in lateral view. Borehole Bút-2: 93.2 m
Fig. 4. LV. in lateral view. Borehole Bút-2: 93.2 m

Figs 5-7. *Kerocythere* cf. *reticulata* KRISTAN-TOLLMANN, 1972
Fig. 5. C in right view. Borehole Bht-6: 121.7 m
Fig. 6. C in left view. Borehole Bht-6: 121.7 m
Fig. 7. C in dorsal view. Borehole Bht-6: 121.7 m

Figs 8-9. *Kerocythere veghae* KOZUR, 1971
Fig. 8. C in left view. Borehole Bht-6: 121.7 m
Fig. 9. C in dorsal view. Borehole Bht-6: 121.7 m

Figs 10-12. *Renngartenella sanctaecrucis* KRISTAN-TOLLMANN, 1973
Fig. 10. C in right view. Borehole Bht-6: 121.7 m
Fig. 11. C in right view. Borehole Bht-6: 121.7 m
Fig. 12. C in left view. Borehole Bht-6: 121.7 m

Figs 13-15. *Simeonella brotzenorum* SOHN, 1968
Fig. 13. C in right view. Borehole Bht-6: 121.7 m
Fig. 14. C in left view. Borehole Bht-6: 121.7 m
Fig. 15. C in dorsal view. Borehole Bht-6: 121.7 m
Fig. 16. *Simeonella reissi* SOHN, 1968. C in right view. Borehole Bht-6: 121.7 m

Scale bar = 100 µm. Abbreviations: C = Carapace, RV = Right valve, LV = Left valve.

Plate 3