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PALAEOECOLOGICAL CHANGES AFTER THE END-PERMIAN MASS EXTINCTION: EARLY TRIASSIC OSTRACODS FROM NORTHWESTERN GUANGXI PROVINCE, SOUTH CHINA

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Abstract. Early Triassic (Griesbachian to Spathian) ostracod faunas are here first discovered and described form the Guangxi Province, South China. Thirty-seven species belonging to fourteen genera are recognized. Seven species are new: *Bairdia fengshanensis* n. sp., *Bairdia wailiensis* n. sp., *Liuzhinia guangxiensis* n. sp., *Ptychobairdia luciae* n. sp., *Ptychobairdia aldae* n. sp., *Paracypris jinyaensis* n. sp. and *Paracypris gaetanii* n. sp. The Griesbachian assemblage from the basal microbial limestone is well diversified and does not suggest any abnormal palaeoenvironmental conditions in terms of salinity, temperature or oxygen content. Particularly, the ostracods are typical of well oxygenated water and do not reflect any anoxia. Dienerian and Smithian ostracods are evidenced for the first time and the assemblages suggest less favourable palaeoenviromental conditions. Diversity and abundance of ostracod assemblages recovered from the Spathian on. The main taxonomic turnover among ostracod assemblages occurred seemingly between the Griesbachian and the Spathian.

Riassunto. Una fauna di ostracodi del Triassico inferiore (Griesbachiano - Spathiano), tra cui 37 specie appartenenti a 14 generi, é messa in evidenza e descritta per la prima volta nella Provincia del Guangxi, Cina del Sud. Sette nuove specie sono riportate: *Bairdia fengshanensis* n. sp., *Bairdia wailiensis* n. sp., *Liuzhinia guangxiensis* n. sp., *Ptychobairdia luciae* n. sp., *Ptychobairdia aldae* n. sp., *Paracypris jinyaensis* n. sp. and *Paracypris gaetanii* n. sp. Paradossalmente, il contenuto fossilifero estratto dalle microbialiti basali del Griesbachiano risulta essere caratterizzato da una notevole diversità specifica. Il periodo in questione non appare quindi essere soggetto da alcun stress ambientale in termini di variazioni di salinità, di temperatura o/e di concentrazione in ossigeno. Più precisamente, la fauna del Triassico basale non riflette condizioni anossiche ma dimostra, al contrario, di essere tipica di un ambiente ben ossigenato. La bassa diversità degli ostracodi Dieneriani e Smithiani, riportati qui per la prima volta, suggerisce delle condizioni paleoambientali meno favorevoli rispetto al Triassico basale. Un netto aumento della diversità e dell'abbondanza relativa è osservato a partire dallo Spathiano. Il più importante sconvolgimento tassonomico del Triassico inferiore appare quindi avere luogo nell'intervallo tra Griesbachiano e Spathiano.

Introduction

In the entire marine realm, the end Permian mass-extinction is the most dramatic event of the Phanerozoic. At the end of the Permian, 49 to 57% of the marine families, 83% of the genera and 96% of the species, disappear (Sepkoski 1992; Erwin 1993; Jablonski 1994; Benton 1995; Lethiers 1998; the figures vary according to the different authors).

As other marine organisms, benthic ostracods are subject to the effects of calamitous events (among others, the great end Permian regression followed by the quick and dysoxic Lower Triassic transgression, the modifications of climates and oceanic circulation, the salinity drop, the volcanism, linked with Pangaea assemblage; synthesis in Lethiers 1998). Ostracods are, for the most part, benthic inhabitants and reflect the variations of palaeoenvironments. The analysis of ostracod assemblages through Permian - Triassic boundary could help us to understand what the most important events on the biosphere are.

The abiotic events around the Permian – Triassic boundary left the marine biotopes severely shattered. Faunal recovery linked with the return to more hospi-

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table palaeoenvironmental conditions was seemingly very slow and progressive. The record of Early Triassic marine ostracods is generally poorly known. Some species have been mentioned, in more or less detail, from the Induan - Olenekian of northwestern Australia (Jones 1970), Pakistan (Sohn 1970), Precaspian Depression (Schneider 1948, 1960; Khuktinov & Crasquin-Soleau 1999), Nepal (Kozur 1971), Kashmir (Agarwal 1979, 1980, 1981), Germanic Basin (Kozur 1973), Israel (Hirsch & Gerry 1974), South China (Wang 1978; Wei 1981; Hao 1992, 1994), and Greece (Crasquin-Soleau & Baud 1998). More recently, sections of Permian - Triassic boundary sections from Turkey (Crasquin-Soleau et al. 2004a, b) and South China (Sichuan - Crasquin-Soleau & Kershaw 2005) brought new insights on the earliest Triassic ostracod faunas. Age constraints of the samples analysed in the present study are provided by ammonoids.

The ostracod faunas reported here contribute important new data to the benthic component during the Early Triassic and yield insights on palaeoenvironmental conditions.

Geological setting

The Jinya/Waili section presented in this study is located in the Fengshan District of northwestern Guangxi Province (Fig. 1). It belongs to the Nanpanjiang basin (Lehrmann et al. 1998) or to the Youjiang sedimentary province as defined by Tong & Yin (2002). Early Triassic marine rocks in the Jinya area belong to the Luolou Formation, which is essentially composed of outer platform, mixed carbonate and fine grained siliciclastic rocks. The basal Early Triassic strata of the Jinya section markedly differ from the rest of the Luolo Formation in that they are composed of thrombolitic limestone identical to that described from Sichuan (Kershaw et al. 1999; Ezaki et al. 2003). As previously reported by Chao (1959), the Luolou Formation contains a relatively comprehensive sequence of ammonoids, most of which being of Olenekian age (Smithian and Spathian).

The approximately 80 m thick, Early Triassic sedimentary succession of the Jinya area (Fig. 2) starts with a 7 m-thick sequence of a calcimicrobial limestone, which unconformably overlies shallow water limestone of Permian age. The unit is mainly composed by digitate

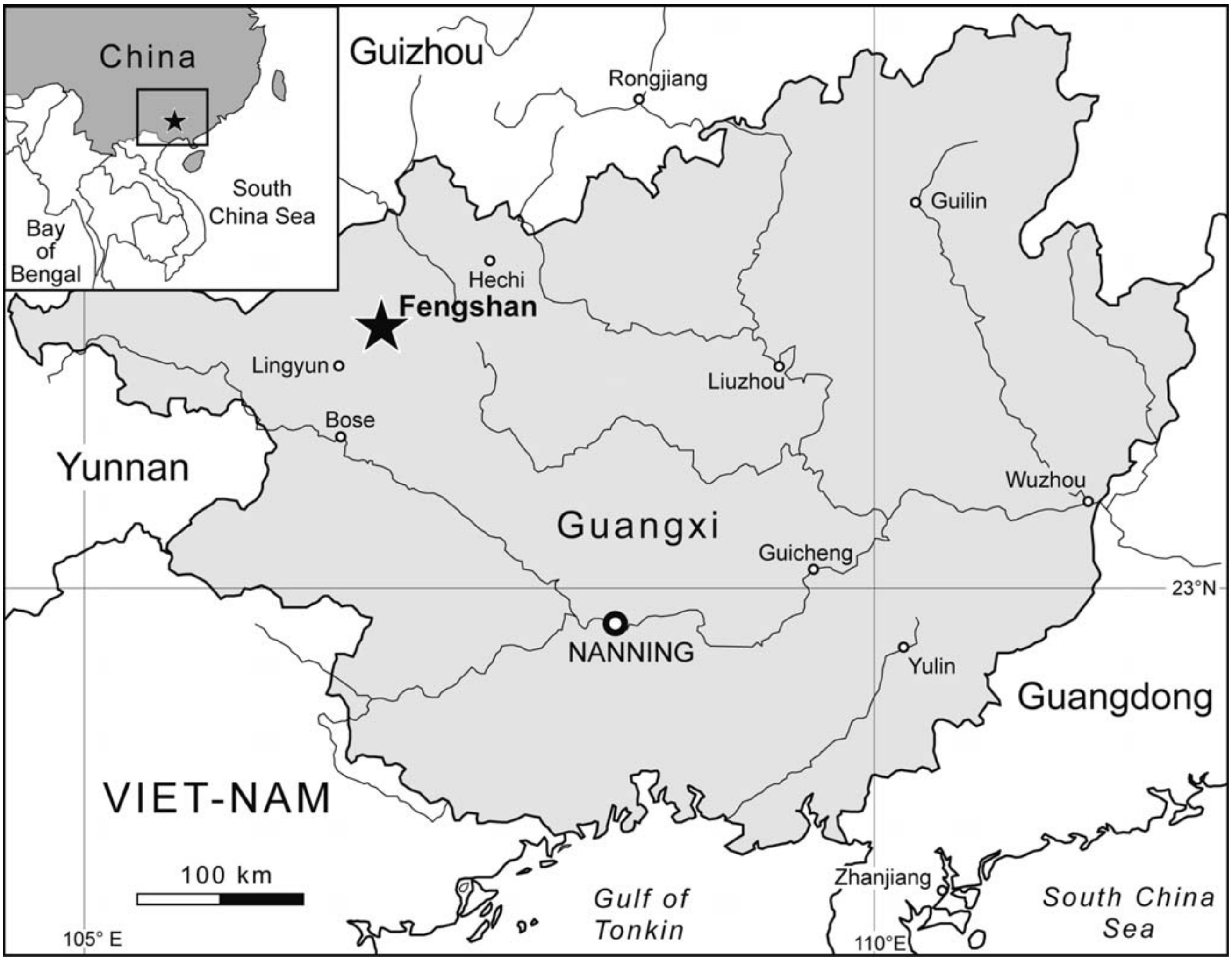


Fig. 1 - South China map. Location of outcrops. Star marks the location of the Jiuya - Waili section.

carbonate (sensu Kershaw et al. 1999), locally thrombolitic in its lower part, with lobate fabric. This facies displays strong similarities with the microbial crust discovered in the Huaying Mountains (eastern Sichuan, China) as described by Kershaw et al. (1999, 2002) and Ezaki et al. (2003) and indicates a vast lateral extension of microbial limestone in the South China Block. The Early Triassic recurrence of these so-called "post-mass extinction disaster forms" (Schubert & Bottjer 1992) is also well documented in other Tethyan basins (e.g. Southern Alps, Turkey, Iran, Afghanistan) by Baud et al. (1997). The microbial limestone in the Jinya area is assumed to be Griesbachian in age. Its age is also indirectly constrained by the occurrence of poorly preserved ammonoids of Dienerian age in the next overlying thin-bedded limestone and mudstone.

The overlying sediments are chiefly composed of shales alternating with thin-bedded, laminated, pyrite-rich (laminae), micritic limestones. These rocks yield rare ammonoids and benthic bivalves, thus allowing the recognition of the Dienerian and Smithian stages, although the Dienerian-Smithian boundary still needs to be precisely bracketed.

The next overlying unit is a prominent, about 4 m thick, slightly-silty, thin-bedded, ammonoid-rich, grey, laminated limestone of early Smithian age ("*Flemingites* beds"). Age diagnostic ammonoids include *Pseudaspidites*, *Flemingites*, *Mesohedenstroemia*, *Aspenites*, *Pseudaspenites,* and *Juvenites*.

The "*Flemingites* beds" are overlain by thin-bedded ammonoid-rich, dark, laminated, micritic limestones alternating with dark shales devoid of bioturbation. The lower part of this unit yielded a rich *Owenites* fauna ("*Owenites* beds") and the upper part contains a succession composed of two low diversified faunas, the *Anasibirites* and *Xenoceltites* faunas, in ascending order. The *Xenoceltites* fauna typically occurs within the few uppermost meters of this unit, within early diagenetic, small-sized limestone nodules embedded in laminated black shales.

The Smithian-Spathian transition is marked by an abrupt lithologic change to a 40 m thick series of medium bedded, light-grey, highly bioturbated, nodular limestone with dispersed, large neomorphic pyrite crystals. The middle part of the nodular limestone unit is characterized by a marly-dominated limestone. Ammonoid occurrences throughout the nodular limestone unit indicate that its deposition spanned almost the entire Spathian stage, from the "*Tirolites* beds" up to the Haugi Zone. The nodular limestone is also characterized by a significant bioclastic content including abundant ostracod assemblages, microbrachiopods, microgasteropods and rare benthic bivalves.

The transition from the carbonate outer platform (Luolou Formation) to the overlying mudstone of Anisian age (Baifeng Formation) is marked by the intercalation of a dominantly siliceous, 5-6 m thick, nodular facies ("Transition beds") containing abundant volcaniclastic beds. This siliceous, nodular facies indicates an obvious drowning of the platform and coincides with the change from a carbonate-dominated regime to a siliciclastic regime. Scarce ammonoid occurrences in the Transition beds suggest an early Anisian age.

The Baifeng Formation of Anisian age is composed of a very thick series (>1000 m) consisting of thickening and coarsening upward siliciclastic turbidites. Scarce ammonoid horizons (e.g. a *Balatonites* fauna of latest middle Anisian age) and thin-shelled bivalves (*Daonella*) of upper Anisian age occur in the Baifeng Formation.

Palaeontology

Twenty nine samples were treated by hot acetolysis (Lethiers & Crasquin-Soleau 1988; Crasquin-Soleau et al. 2005) of which fifteen yielded ostracods (see Fig. 2).

Thirty-seven species belonging to fourteen genera were identified and most of them are figured (Pl. 1-4). Seven species are new and are described here. All the specimens are deposited in the Pierre et Marie Curie University (Paris, France) collection (numbers: P6M).

Systematic Palaeontology

Abbreviations: L: length, H: height, W: width.

Order **Podocopida** Müller,1954

Suborder Podocopina Sars, 1866

Superfamily Bairdiacea Sars, 1888

Family Bairdiidae Sars, 1888

Genus *Bairdia* McCoy, 1844

Type species: *Bairdia curta* McCoy, 1844

Bairdia fengshanensis Crasquin-Soleau n. sp.

Pl. 1, figs 1-6

Derivation of name. From Fengshan area, locus typicus.

Holotype. One complete carapace figured Pl. 1, fig. 1; collection number P6M2164.

Paratype. One complete carapace figured Pl. 1, fig. 4, collection number P6M2167.

Type-level. Sample JINTUFF2, Jinya upper quarry section (GPS coordinates: N24°34'32" - E106°53'87"), Fengshan area, Guangxi Province, South China; "Haugi zone", Spathian; Early Triassic.

Material. 20 carapaces and some fragments

Diagnosis. A species of the genus *Bairdia* with regularly arched dorsal border and laterally compressed antero-ventral border.

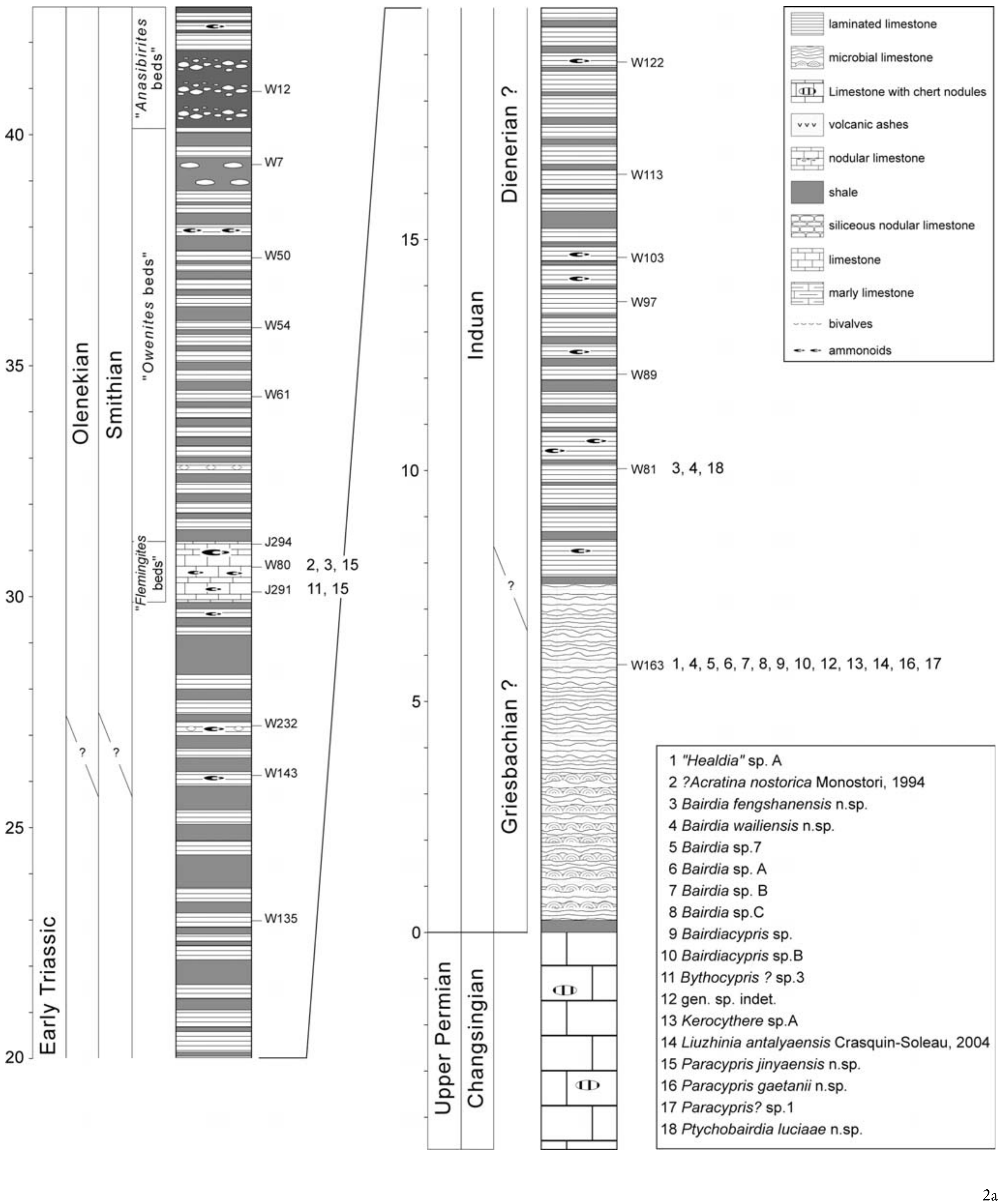
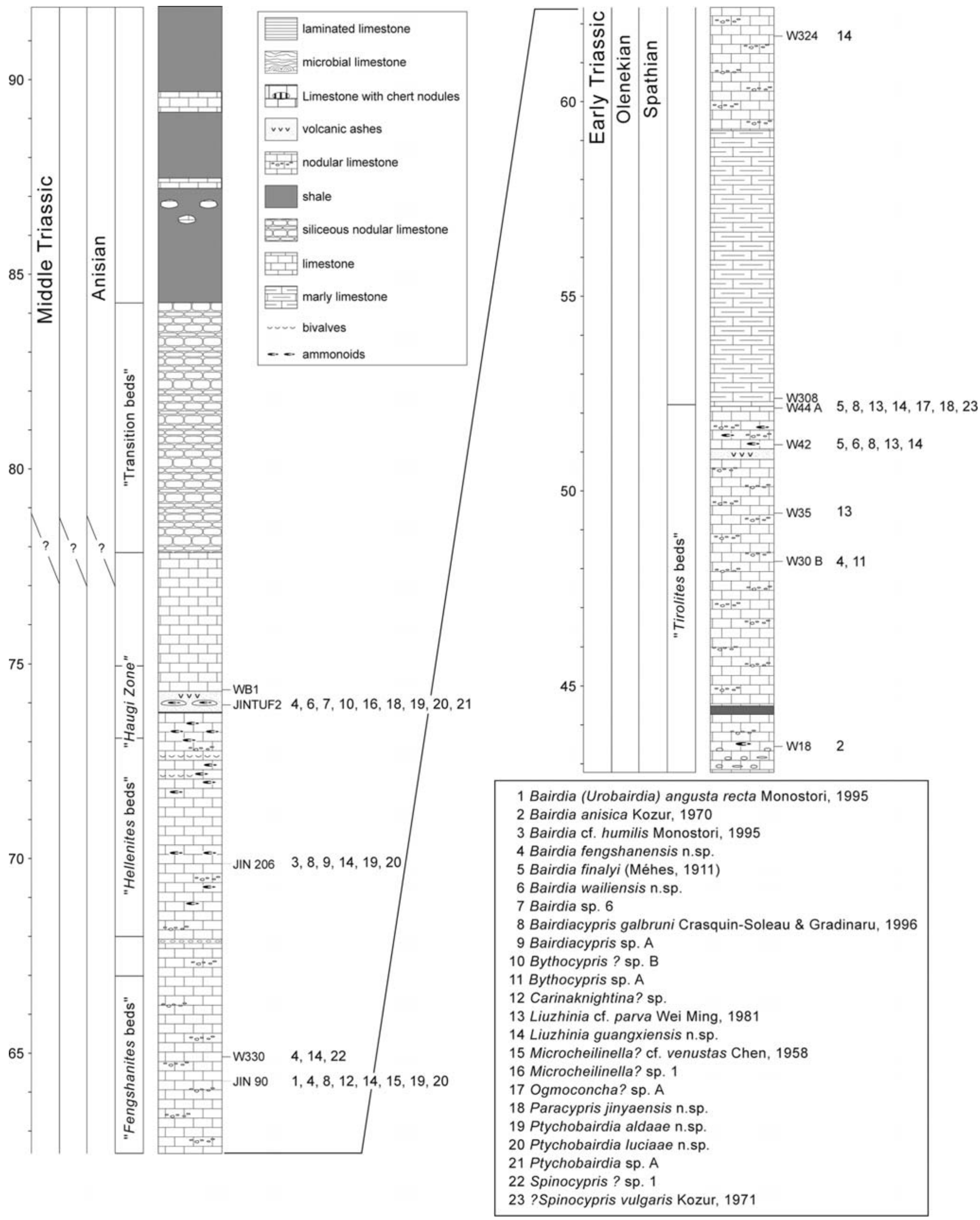


Fig. 2a,b - Jinya / Waili composite section with Early Triassic ostracod distribution


laminated limestone
microbial limestone
Limestone with chert nodules
volcanic ashes
nodular limestone
shale
siliceous nodular limestone
limestone
marly limestone
bivalves
ammonoids
Middle Triassic
Anisian
"Transition beds"
"Haugi Zone"
"Hellenites beds"
"Fengshanites beds"
90
85
80
75
70
65
WB1
JINTUF2 4, 6, 7, 10, 16, 18, 19, 20, 21
JIN 206 3, 8, 9, 14, 19, 20
W330 4, 14, 22
JIN 90 1, 4, 8, 12, 14, 15, 19, 20
Early Triassic
Olenekian
Spathian
"Tirolites beds"
60
55
50
45
W324 14
W308
W44 A 5, 8, 13, 14, 17, 18, 23
W42 5, 6, 8, 13, 14
W35 13
W30 B 4, 11
W18 2
1 Bairdia (Urobairdia) angusta recta Monostori, 1995
2 Bairdia anisica Kozur, 1970
3 Bairdia cf. humilis Monostori, 1995
4 Bairdia fengshanensis n.sp.
5 Bairdia finalyi (Méhes, 1911)
6 Bairdia wailiensis n.sp.
7 Bairdia sp. 6
8 Bairdiacypris galbruni Crasquin-Soleau & Gradinaru, 1996
9 Bairdiacypris sp. A
10 Bythocypris ? sp. B
11 Bythocypris sp. A
12 Carinaknightina? sp.
13 Liuzhinia cf. parva Wei Ming, 1981
14 Liuzhinia guangxiensis n.sp.
15 Microcheilinella? cf. venustas Chen, 1958
16 Microcheilinella? sp. 1
17 Ogmoconcha? sp. A
18 Paracypris jinyaensis n.sp.
19 Ptychobairdia aldaae n.sp.
20 Ptychobairdia luciaae n.sp.
21 Ptychobairdia sp. A
22 Spinocypris ? sp. 1
23 ?Spinocypris vulgaris Kozur, 1971

2b

Description. Stocky carapace; dorsal border regularly convex; anterior border with relatively small radius of convexity, maximum of convexity located above mid-height, gently compressed laterally; ventral border almost straight; anterior border strongly compressed laterally, ventral part quite vertical; low overlap of right valve by left one, maximum in dorsal part; dorsal view biconvex, with ends laterally compressed.

Remarks. *Bairdia fengshanensis* n. sp. has the same outline than *Bairdia balatonica* Méhes, 1911 from Carnian of Balaton Highland (Hungary) (Méhes 1911; Monostori 1994) but here the ventral part of anterior border is more vertical. *Bairdia fengshanensis* n. sp. presents the same anterior and posterior lateral flattening as *Bairdia (Rectobairdia) sandulescui* Crasquin-Soleau & Gradinaru, 1996 from the Early Anisian of Rumania (Crasquin-Soleau & Gradinaru 1996) but has a convex dorsal border.

Size. L= 375-850 µm, H= 220-550 µm, W= 160-310 µm.

Stratigraphic and geographic distribution. Early Triassic (Dienerian - Spathian, see Tab. 1), Fengshan area, Guangxi Province, South China.

Bairdia wailiensis Crasquin-Soleau n. sp.

Pl. 1, figs 15-17

Derivation of name. From Waili section, locus typicus.

Holotype. One complete carapace figured Pl. 1, fig. 15; collection number P6M2178.

Paratype. One complete carapace figured Pl. 1, fig. 16, collection number P6M2179.

Type-level. Sample W163, South Waili section (N24°35'07" - E106°52'59"), Fengshan area, Guangxi Province, South China; Griesbachian?, Early Triassic.

Material. 10 carapaces and some fragments.

Diagnosis. A species of the genus *Bairdia* with anterior border narrow and showing a maximum of convexity located high.

Description. Light carapace with arched dorsal border which could nevertheless be divided in three almost straight parts; anterior border with narrow radius of curvature with maximum located high, gently compressed laterally; ventral border concave, at both valves, maximum in front of mid-length; posterior border narrow with maximum of curvature located low (near lower ¼ of height); carapace biconvex in dorsal view, with anterior part gently compressed.

Remarks. This new species is very particular and no other species is closely related to it.

Size. L= 310-550 µm, H= 190-315 µm, W= 110-180 µm.

Stratigraphic and geographic distribution. Early Triassic (Griesbachian? - Spathian, see Tab. 1), Fengshan area, Guangxi Province, South China.

Bairdia finalyi (Méhes, 1911)

Pl. 1, figs 7-8

Stratigraphic and geographic distribution. Early - Middle Triassic (Olenekian, Smithian to Ladinian, Tab. 1), Fengshan area, Guangxi Province, South China, Hungary Balaton area (Méhes 1911; Kozur 1971; Monostori 1995).

Bairdia anisica Kozur, 1970

Pl. 1, fig. 9

Stratigraphic and geographic distribution. Early - Middle Triassic (Late Olenekian (Spathian) to Late Anisian, Tab. 1), Fengshan area, Guangxi Province, South China and Germany (Kozur 1970).

Bairdia (Urobairdia) angusta recta Monostori, 1995 = **Bairdia** sp. 7 sensu Crasquin-Soleau & Gradinaru, 1996

Pl. 1, figs 10-11

Stratigraphic and geographic distribution. Early - Middle Triassic (Late Olenekian (Spathian) to Late Anisian, see Tab. 1), Fengshan area, Guangxi Province, South China; Dobrogea (Rumania) (Crasquin-Soleau & Gradinaru 1996); Balaton Lake area (Hungary) (Monostori 1995).

Bairdia cf. **humilis** Monostori, 1995

Pl. 1, fig. 18

Stratigraphic and geographic distribution. Early Triassic (Late Olenekian (Spathian), see Tab. 1), Fengshan area, Guangxi Province, South China.

Bairdia sp. A

Pl. 1, fig. 19

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, Tab.1); Fengshan area, Guangxi Province, South China.

Bairdia sp. B

Pl. 1, fig. 20

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, Tab. 1); Fengshan area, Guangxi Province, South China.

Bairdia sp. C

Pl. 1, fig. 21

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, Tab. 1); Fengshan area, Guangxi Province, South China.

?*Acratina nostorica* Monostori, 1994	W80	Smithian
Bairdia anisica Kozur, 1970	W18	Spathian
Bairdia cf. *humilis* Monostori, 1995	JIN206	Spathian
Bairdia fengshanensis n.sp.	W81, W80, W30B, JIN90, W330, JINTUF2	Dienerian - Spathian
Bairdia finalyi (Méhes, 1911)	W42, W44A	Spathian
Bairdia sp.A	W163	Griensbachian?
Bairdia sp.B	W163	Griensbachian?
Bairdia sp.C	W163	Griensbachian?
Bairdia sp.6	JINTUF2	Spathian
Bairdia sp.7	W163	Griensbachian?
Bairdia wailiensis n.sp.	W163, W81, W42, JINTUF2	Griensbachian? - Spathian
Bairdia (Urobairdia) angusta recta Monostori, 1995	JIN90	Spathian
Bairdiacypris galbruni Crasquin-Soleau & Gradinaru, 1996	W42, W44A, JIN90; JIN206	Spathian
Bairdiacypris sp.	W163	Griensbachian?
Bairdiacypris sp.A	JIN206	Spathian
Bairdiacypris sp.B	W163	Griensbachian?
Bythocypris sp. A	W30B	Spathian
Bythocypris ? sp.B	JINTUF2	Spathian
Bythocypris ? sp.3	J291	Smithian
Carinaknightina? sp.	JIN90	Spathian
gen. sp. indet.	W163	Griensbachian?
"*Healdia*" sp.A	W163	Griensbachian?
Kerocythere sp.A	W163	Griensbachian?
Liuzhinia antalyaensis Crasquin-Soleau, 2004	W163	Griensbachian?
Liuzhinia guangxiensis n.sp.	W42, W44A, W324, JIN90; W330, JIN206	Spathian
Liuzhinia cf. *parva* Wei Ming, 1981	W35, W42, W44A	Spathian
Microcheilinella? cf. *venusta* Chen, 1958	W44A, JIN90	Spathian
Microcheilinella? sp.1	JINTUF2	Spathian
Ogmoconcha? sp.A	W44A	Spathian
Paracypris gaetanii n.sp.	W163	Griensbachian?
Paracypris jinyaensis n.sp.	J291, W80, W44A, JINTUF2	Smithian - Spathian
Paracypris? sp.1	W163	Griensbachian?
Ptychobairdia aldaae n.sp.	JIN90; JIN206, JINTUF2	Spathian
Ptychobairdia luciaae n.sp.	W81, JIN90; JINTUF2, JIN206	Dienerian - Spathian
Ptychobairdia sp.A	JINTUF2	Spathian
?*Spinocypris vulgaris* Kozur, 1971	W44A	Spathian
Spinocypris ? sp.1	W330	Spathian

Tab. 1 - List of encountered species and stratigraphic distribution.

Genus *Bairdiacypris* Bradfield, 1935

Type species: *Bairdiacypris deloi* Bradfield, 1935

Bairdiacypris galbruni Crasquin-Soleau & Gradinaru, 1996

Pl. 1, figs 13-14

Stratigraphic and geographic distribution. Early - Middle Triassic (Spathian (Tab. 1) to Early Anisian); Fengshan area, Guangxi Province, South China; Dobrogea, Rumania (Crasquin-Soleau & Gradinaru 1996).

Bairdiacypris sp. A

Pl. 1, fig. 12

Stratigraphic and geographic distribution. Early Triassic, Late Olenekian (Spathian, Tab. 1); Fengshan area, Guangxi Province, South China.

Bairdiacypris sp. B

Pl. 4, fig. 7

Stratigraphic and geographic distribution. Early Triassic, Late Olenekian (Spathian, Tab. 1); Fengshan area, Guangxi Province, South China.

Genus *Liuzhinia* Zheng, 1976

Type species: *Liuzhinia subovata* Zheng, 1976

Liuzhinia guangxiensis Crasquin-Soleau n. sp.

Pl. 2, figs 11-18

Derivation of name. From Guangxi Province (South China) where the type level is located.

Holotype. One complete carapace, figured Pl. 2, fig. 11, collection number P6M2192.

Paratype. One complete carapace, figured Pl. 2, fig. 12, collection number P6M2193.

Type level. Sample JIN90, Early Triassic, Late Olenekian (Spathian, see Tab. 1); Jinya Upper Quarry section (N24°34'32" - E106°53'87"), Guangxi Province (South China).

Material. 450 carapaces and numerous fragments

Diagnosis. Species of *Liuzhinia* with high anterior border and tapering posterior border.

Description. Carapace smooth, very dissymmetric; anterior border with large radius of curvature, maximum of curvature located at or above mid-height; ventral border nearly straight at left valve and gently concave at right valve; posterior border tapering; dorsal border regularly arched; dorsal view biconvex with maximum of width around mid-length.

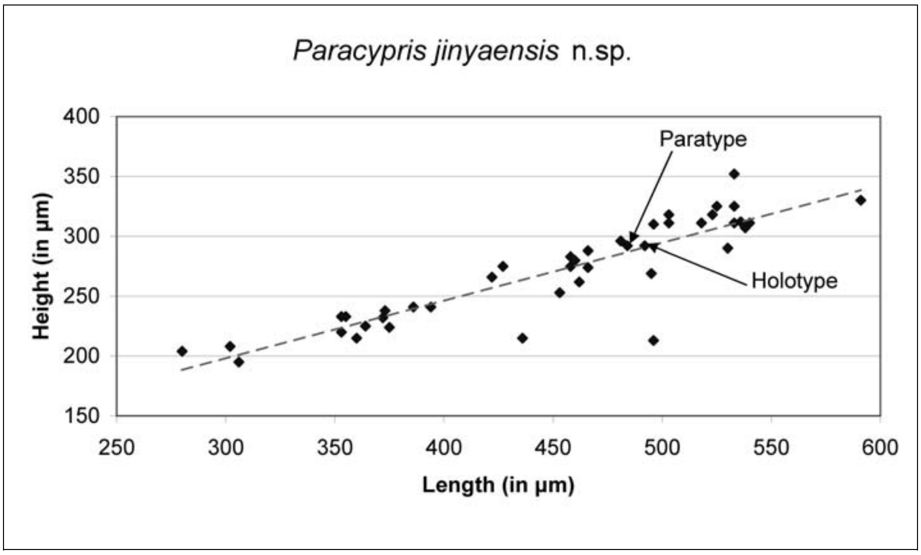


Fig. 3 - Height - length diagram of *Paracypris jinyaensis* n. sp.

Remarks. Wei (1981) described two species (*Liuzhinia subovata* Zheng, 1976 and *Liuzhinia parva* Wei, 1981) from the Early and Middle Triassic from Sichuan (South China). The figured specimens (Wei 1981, pl. 2) seem to belong to the same species (*Liuzhinia parva* Wei, 1981) with only a difference of size. *Liuzhinia guangxiensis* n. sp. differs from this species and from *Liuzhinia antalyaensis* Crasquin-Soleau, 2004 (Pl. 3, fig. 12-13) from Induan of Western Taurus (Crasquin-Soleau et al. 2004b) by its posterior border more tapering and its anterior border higher.

Size. L= 280-590 µm, H= 205-330 µm, W= 185-240 µm (Fig. 3).

Stratigraphic and geographic distribution. Early Triassic, Late Olenekian (Spathian, see Tab. 1), Fengshan area, Guangxi Province, South China;

Liuzhinia antalyaensis Crasquin-Soleau, 2004

Pl. 3, figs 12-13

Remark. *Liuzhinia antalyaensis* was found in the *parvus* zone in Western Taurus (Turkey) (Crasquin-Soleau et al. 2004b). This could give in first approximation a Griesbachian age to the sample W163. The Chinese species are reported in the H/L diagram of Turkish specimens (Fig. 4).

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, Tab.1), Fengshan area, Guangxi Province, South China and Western Taurus, Turkey.

Liuzhinia cf **parva** Wei, 1981

Pl. 2, fig. 19

Remark. The specimens found here are close to *Liuzhinia parva* Wei, 1981 from Late Induan - Early

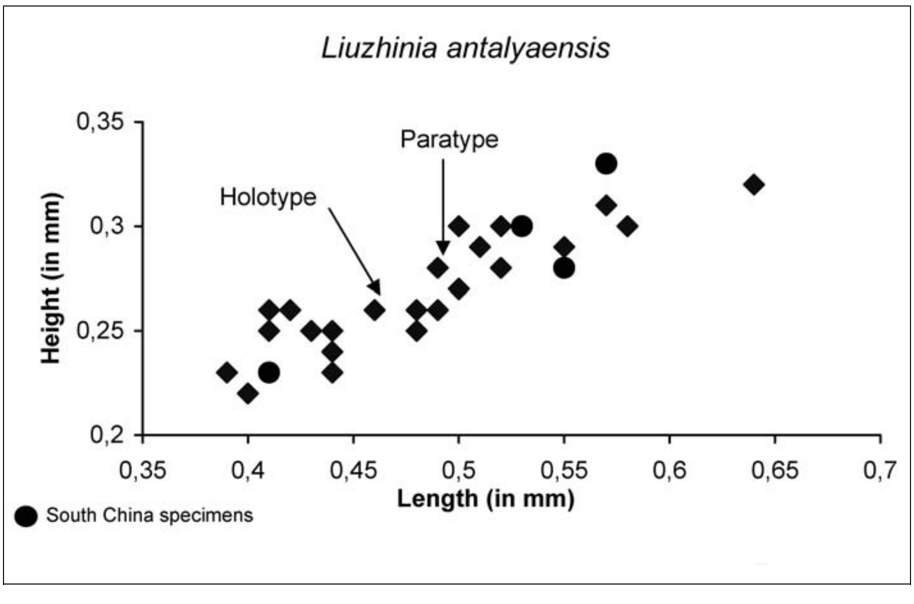


Fig. 4 - Height - length diagram of *Liuzhinia antalyaensis* Crasquin-Soleau, 2004. South China specimens (circles) are inserted into the original diagram of Turkey specimens (diamonds).

Olenekian from Emei (South China), but here the dorsal border is more regularly arched. The material discovered here is not sufficient to define its specific determination.

Stratigraphic and geographic distribution. Early Triassic, Late Olenekian (Spathian, Tab. 1), Fengshan area, Guangxi Province, South China.

Genus *Bythocypris* Brady, 1880

Type species: *Bairdia bosquetiana* Brady, 1866

Bythocypris sp. A

Pl. 2, fig. 20

Stratigraphic and geographic distribution. Early Triassic, Late Olenekian (Spathian, Tab. 1), Fengshan area, Guangxi Province, South China.

Bythocypris? sp. B

Pl. 2, figs 9-10

Stratigraphic and geographic distribution. Early Triassic, Late Olenekian (Spathian, Tab. 1), Fengshan area, Guangxi Province, South China.

Genus *Ptychobairdia* Tollmann, 1960

Type species: *Ptychobairdia kuepperi* Kollmann, 1960

Ptychobairdia luciae Crasquin-Soleau n. sp.

Pl. 3, figs 1-5

Derivation of name. Dedicated to Dr. Lucia Angiolini, Dip. Scienze della Terra "Ardito Desio", Milano, Italy.

Holotype. One complete carapace, figured Pl. 3, fig. 1, collection number P6M2202.

Paratype. one complete carapace, figured pl. 3, fig. 3, collection number P6M2203.

Type level. Sample JIN90, "*Fengshanites* beds" Jinya, Upper Quarry section (N24°34'32", E106°53'87"), Guangxi Province (South China). Spathian, Early Triassic.

Material. 6 carapaces and numerous fragments

Diagnosis. Species of *Ptychobairdia* with only two ridges (one dorsal and one ventral), straight dorsal border and narrow posterior border.

Description. Massive carapace; dorsal border nearly straight on both valves in juveniles stages, gently convex at right valve and concave at left valve for adults specimens; anterior border with relatively small radius of curvature; ventral border convex at left valve and concave at right valve; posterior border with very small radius of curvature; dorsal and ventral ridges poorly pronounced; no lateral ridges; carapace thick dorsal view; anterior and posterior borders flattened laterally; no visible ornamentation (preservation?).

Remarks. *Ptychobairdia luciae* n. sp. is close to *Ptychobairdia medwenitschi* Kollman, 1960 from the Late Triassic from Austria (Kollmann 1960); *Ptychobairdia luciae* n. sp. differs from this species by the absence of lateral ridges, by the posterior border much narrow and by the dorsal border more rectilinear.

Size. L= 520-900 μm, H= 320-570 μm, W= 280-440 μm.

Stratigraphic and geographic distribution. Early Triassic, Late Olenekian (Dienerian - Spathian, Tab. 1), Fengshan area, Guangxi Province, South China.

Ptychobairdia aldae Crasquin-Soleau n. sp.

Pl. 3, figs 7-11

Derivation of name. Dedicated to Prof. Alda Nicora, Dip. Scienze della Terra "Ardito Desio", Milano, Italy.

Holotype. One complete carapace, figured Pl. 3, fig. 7, collection number P6M2208.

Paratype. One complete carapace, figured Pl. 3, fig. 8, collection number P6M2209.

Type level. Sample JIN90, Early Triassic, Late Olenekian (Spathian); Jinya Upper Quarry section (N24°34'32" - E106°53'87"), Guangxi Province (South China).

Material. 8 carapaces and numerous fragments

Diagnosis. Species of *Ptychobairdia* with narrow anterior and posterior borders and two lateral ridges.

Description. Massive carapace; dorsal border convex at right valve; straight to gently concave at left valve; anterior border with relatively small radius of curvature; ventral border nearly straight at right valve, gently concave at left valve; posterior border with small radius of curvature; dorsal, ventral ridges well developed, presence of two short arched lateral ridges; anterior and posterior borders strongly compressed laterally; secondary ornamentation not observable.

Remarks. *Ptychobairdia aldae* n. sp. is close to *Ptychobairdia ruttneri* Kristan-Tollmann, 1991 from Late Ladinian of Iran by the two lateral ridges. *Ptychobairdia ruttneri* Kristan-Tollman, 1991 has an additional adventral ridge, dorsal and ventral ridges are more pronounced and are butt-jointed in posterior part of the carapace.

Size. L= 510-930 μm, H= 400-530 μm, W= 270-460 μm.

Stratigraphic and geographic distribution. Early Triassic, Late Olenekian (Spathian, Tab. 1), Fengshan area, Guangxi Province, South China.

Genus *Spinocypris* Kozur, 1971

Type species: *Spinocypris vulgaris* Kozur, 1971

?Spinocypris vulgaris Kozur, 1971

Pl. 3, fig. 14

Stratigraphic and geographic distribution. Early - Middle Triassic (Scythian - Late Anisian, Tab.1), Fengshan area, Guangxi Province, South China, Austria, Hungary, Nepal, Greece (Bunza & Kozur 1971), Rumania (Crasquin-Soleau & Gradinaru 1996).

Genus *Acratina* Egorov, 1953

Type species: *Acratina pestrozvetica* Egorov, 1953

?Acratina nostorica Monostori, 1994

Pl. 4, figs 5-6

Stratigraphic and geographic distribution. Early to Late Triassic (Smithian - Carnian, see table 1), Fengshan area, Guangxi Province, South China, Hungary (Monostori 1994).

Genus *Paracypris* Sars, 1866

Type species: *Paracypris polita* Sars, 1866

Paracypris jinyaensis Crasquin-Soleau n. sp.

Pl. 2, figs 1-8

Derivation of name. From Jinya area, locus typicus (Guangxi Province, South China).

Holotype. One complete carapace, figured Pl. 2, fig. 1, collection number P6M2182.

Paratype. One complete carapace, figured Pl. 2, fig. 2, collection number P6M2283.

Type level. Sample J291, Early Olenekian, Smithian; Lower part of "*Flemingites* beds", Jinya section (N24°34'23" - E106°53'26"), Guangxi Province, South China.

Material. 12 carapaces and some fragments.

Diagnosis. Species of *Paracypris* with very elongate carapace, small height and anterior border with small radius of curvature.

Description. Smooth carapace elongate (0.41<H/L<0.49); posterior part of dorsal border long and straight; maximum of height located at or a little bit in front of anterior third of length; anterior border with small radius of curvature, slightly compressed laterally; ventral borer long, nearly straight at right valve, gently concave at left valve; posterior border with very small radius of curvature; in dorsal view carapace biconvex, not very thick, maximum of thickness located around mid-length; left valve overlaps right valve with a maximum on ventral border.

Size. L= 320-400 µm, H= 145-200 µm, W= 140-158 µm.

Stratigraphic and geographic distribution. Early Triassic, Olenekian (Smithian - Spathian, Tab. 1), Fengshan area, Guangxi Province, South China.

Paracypris gaetanii Crasquin-Soleau n. sp.

Pl. 4, figs 1-4

1999 *Paracypris* sp. Hao Wei-cheng p.42, pl.1, fig. 24

Derivation of name. Dedicated to Prof. Maurizio Gaetani, Dip. Scienze della Terra "Ardito Desio", Milano, Italy.

Holotype. One complete carapace, figured Pl. 4, fig. 1, collection number P6M2217.

Paratype. One complete carapace, figured Pl. 4, fig. 2, collection number P6M2218.

Type level. Sample W163, Griesbachian?, South Waili section (N24°35'07", E106°52'59"), Guangxi Province, South China.

Material. 12 carapaces and some fragments

Diagnosis. A species of *Paracypris* with straight and long dorsal border, anterior border large and regularly arched, maximum of height located at the anterior quarter of length.

Description. Smooth carapace elongate (0.48<H/L<0.55); dorsal border very long (~ 70% of length) and straight; anterior border with large radius of curvature, with maximum of curvature located around mid-height; ventral border long and straight; posterior border regularly arched with small radius of curvature, maximum of curvature located near lower ¼ of height; left valve faintly overlaps right one on free margins; carapace biconvex in dorsal view.

Remarks. Hao (1992) figured an incomplete specimen (pl.1, fig. 24) from the Early Triassic of Guizhou (South China). Although, the specimen is larger (L= 590 µm, H= 270 µm; Hao, p.42), the ratio H/L is perfectly in accordance with measurements of the new species.

Size. L= 340-490 µm, H= 180-250 µm, W= 150-180 µm.

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?; Tab. 1), Fengshan area, Guangxi Province, South China.

Paracypris? sp.1

Pl. 4, figs 8-9

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, Tab. 1), South Fengshan area, Guangxi Province, South China.

Superfamily Sigilliacea Mandelstam, 1960

Family Microcheilinellidae Gramm, 1975

Genus *Microcheilinella* Geis, 1933

Type species: *Microcheilus distortus* Geis, 1932

Microcheilinella cf. **venusta** Chen, 1958

Pl. 4, fig. 12

Remarks. Our species is compared to *Microcheilinella venusta* Chen, 1958 from Early Permian of Lungtan (Qixia Formation; Chen 1958). Here, the posterior border is higher and compressed laterally.

Stratigraphic and geographic distribution. Early Triassic (Spathian, Tab. 1), Fengshan area, Guangxi Province, South China.

Superfamily Cytheracea Baird, 1850

Family Kerocytheridae Kozur, 1971

Genus *Kerocythere* Kozur & Nicklas, 1971

Type species: *Kerocythere raibliana* (Gümbel, 1869)

Kerocythere sp. A

Pl. 3, fig. 6

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, see Tab. 1), Fengshan area, Guangxi Province, South China.

Genus *Ogmoconcha* Triebel, 1941

Type species: *Ogmoconcha contractula* Triebel, 1941

Ogmoconcha? sp. A

Pl. 4, fig. 10

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, Tab. 1), Fengshan area, Guangxi Province, South China.

Suborder Metacopina Sylvester-Bradley, 1961

Superfamily Healdiacea Harlton, 1933

Family Healdiidae Harlton, 1933

Genus *Healdia* Roundy, 1926

Type species: *Healdia simplex* Roundy, 1926

"Healdia" sp. A

Pl. 4, fig. 11

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, Tab. 1), Fengshan area, Guangxi Province, South China.

Order **Palaeocopida** Henningsmoen, 1953

Suborder Kloedenellocopina

Scott, 1961 emend. Lethiers, 1981

Superfamily Kloedenellacea Ulrich & Bassler, 1908

Genus *Carinaknightina* Sohn, 1970

Type species: *Carinaknightina carinata* Sohn, 1970

Carinaknightina? sp.

Pl. 4, fig. 13

Stratigraphic and geographic distribution. Early Triassic (Spathian, Tab. 1), Fengshan area, Guangxi Province, South China.

Ostracoda incertae sedis

Genus and species indet.

Pl. 3, fig. 15

Stratigraphic and geographic distribution. Early Triassic (Griesbachian?, Tab. 1), Fengshan area, Guangxi Province, South China.

Remarks on the stratigraphic distribution of species

The oldest assemblage is of probable Griesbachian age and is composed of thirteen species. The Griesbachian age assignment is linked to the presence in the level W163 (Fig. 2a) of *Liuzhinia antalyaensis* Crasquin-Soleau, 2004, which is so far only known from this time interval from Turkey (Crasquin-Soleau et al. 2004a) and to the location of the sample just above the "microbialites". Indeed, in Huaying Mountains (Eastern Sichuan Province), *Liuzhinia antalyaensis* and the conodont *Hindeodus parvus* were documented in association around the upper boundary of the microbial limestone (Kershaw et al. 2002; Ezaki et al. 2003). With the exception of *Bairdia wailiensis* n. sp. which ranges up to the Spathian (Fig. 2a,b), all the other species occurring in the basal microbial limestone in the Jinaya area do not extend higher up in the section and have a Permian stamp.

PLATE 1

All the specimens from Fengshan area, Guangxi Province, South China. Scale bar 100 µm.

Figs 1-6 - *Bairdia fengshanensis* Crasquin-Soleau n. sp. Fig. 1 - Holotype, collection number: P6M2164, right lateral view of complete carapace; fig. 2 - Collection number: P6M2165, right lateral view of complete carapace; fig. 3 - Collection number: P6M2166, left lateral view of complete carapace; fig. 4 - Paratype, collection number: P6M2167, right lateral view of complete carapace; fig. 5 - Collection number: P6M2168, right lateral view of complete carapace; fig. 6 - Collection number: P6M2169, dorsal view of complete carapace.

Fig. 7-8 - *Bairdia finalyi* (Méhes, 1911). Fig. 7 - Collection number: P6M2170, right lateral view of complete carapace; fig. 8 - Collection number: P6M2171, right lateral view of complete carapace.

Fig. 9 - *Bairdia anisica* Kozur, 1970. Collection number: P6M2172, right lateral view of complete carapace.

Figs 10-11 - *Bairdia (Urobairdia) angusta recta* Monostori, 1995. Fig. 10 - Collection number: P6M2173, right lateral view of nearly complete carapace; fig. 11 - Collection number: P6M2174, right lateral view of complete carapace.

Fig. 12 - *Bairdiacypris* sp. A. Collection number: P6M2175, right lateral view of complete carapace.

Figs 13-14 - *Bairdiacypris galbruni* Crasquin-Soleau & Gradinaru, 1996. Fig.13 - Collection number: P6M2176, right lateral view of complete carapace; fig. 14 - Collection number: P6M2177, right lateral view of complete carapace.

Figs 15-17 - *Bairdia wailiensis* n. sp. Fig. 15 - Holotype, collection number: P6M2178, right lateral view of complete carapace; fig. 16 - Paratype, collection number: P6M2179, right lateral view of complete carapace; fig. 17 - Collection number: P6M2180, right lateral view of complete carapace.

Fig. 18 - *Bairdia* cf. *humilis* Monostori, 1995. Collection number: P6M 2181, right lateral view of broken carapace.

Fig. 19 - *Bairdia* sp. A. Collection number: P6M2230, right lateral view of complete carapace.

Fig. 20 - *Bairdia* sp. B. Collection number: P6M2231, right lateral view of complete carapace.

Fig. 21 - *Bairdia* sp. C. Collection number: P6M2232, right lateral view of complete carapace.

PLATE 2

All the specimens from Fengshan area, Guangxi Province, South China. Scale bar 100 µm.

Figs 1-8 - *Paracypris jinyaensis* Crasquin-Soleau n. sp. Fig.1 - Holotype, collection number: P6M2182, right lateral view of complete carapace; fig. 2 - Paratype, collection number: P6M2183, right lateral view of complete carapace; fig. 3 - Collection number: P6M2184, right lateral view of complete carapace; fig. 4 - Collection number: P6M2185, right lateral view of complete carapace; fig. 5 - Collection number: P6M2186, right lateral view of complete carapace; fig. 6 - Collection number: P6M2187, left lateral view of complete carapace; fig. 7 - Collection number: P6M2188, dorsal view of complete carapace; fig. 8 - Collection number: P6M2189, ventral view of complete carapace.

Figs 9-10 - *Bythocypris*? sp. B. Fig. 9 - Collection number: P6M2190, dorsal view of complete carapace; fig.10 - Collection number: P6M2191, right lateral view of complete carapace.

Figs 11-18 - *Liuzhinia guangxiensis* Crasquin-Soleau n. sp. Fig. 11 - Holotype, collection number: P6M2192, right lateral view of complete carapace; fig. 12 - Paratype, collection number: P6M2193, right lateral view of complete carapace; fig. 13 - Collection number: P6M2194, right lateral view of complete carapace; fig. 14 - Collection number: P6M2195, left lateral view of complete carapace; fig. 15 - Collection number: P6M2196, dorsal view of complete carapace; fig. 16 - Collection number: P6M2197, dorsal view of complete carapace; fig. 17 - Collection number: P6M2198, ventral view of complete carapace; fig. 18 - Collection number: P6M2199, ventral view of complete carapace.

Fig. 19 - *Liuzhinia* cf *parva* Wei, 1981. Collection number: P6M2200, right lateral view of complete carapace.

Fig. 20 - *Bythocypris* sp. A. Collection number: P6M2201, right lateral view of complete carapace.

PLATE 3

All the specimens from Fengshan area, Guangxi Province, South China. Scale bar 100 µm.

Figs 1-5 - *Ptychobairdia luciae* Crasquin-Soleau n. sp. Fig. 1 - Holotype, collection number: P6M2202, right lateral view of complete carapace; fig. 2 - Paratype, collection number: P6M2203, dorsal view of complete carapace; fig. 3 - Collection number: P6M2204, right lateral view of complete carapace; fig. 4 - Collection number: P6M2205, right lateral view of complete carapace; fig. 5 - Collection number: P6M2206, right lateral view of complete carapace.

Fig. 6 - *Kerocythere*? sp. A. Collection number: P6M2207, right lateral view of complete carapace.

Figs 7-11 - *Ptychobairdia aldae* Crasquin-Soleau n. sp. Fig. 7 - Holotype, collection number: P6M2208, right lateral view of complete carapace; fig. 8 - Paratype, collection number: P6M2209, right lateral view of complete carapace; fig. 9 - Collection number: P6M2210, right lateral view of complete carapace; fig. 10 - Collection number: P6M2211, dorsal view of complete carapace; fig. 11 - Collection number: P6M2212, ventral view of complete carapace.

Figs 12-13 - *Liuzhinia antalyaenis* Crasquin-Soleau, 2004. Fig.12 - Collection number: P6M2213, right lateral view of complete carapace; fig. 13 - Collection number: P6M2214, right lateral view of complete carapace.

Fig. 14 - ?*Spinocypris vulgaris* Kozur, 1971. Collection number: P6M2215, right lateral view of complete carapace.

Fig. 15 - gen. and sp. indet. Collection number: P6M2216, lateral view of complete carapace

PLATE 4

All the specimens from Fengshan area, Guangxi Province, South China. Scale bar 100 µm.

Figs 1-4 - *Paracypris gaetanii* n. sp. Fig. 1 - Holotype, collection number: P6M2217, right lateral view of complete carapace; fig. 2 - Paratype, collection number: P6M2218, right lateral view of complete carapace; fig. 3 - Collection number: P6M2219, left lateral view of complete carapace; fig. 4 - Collection number: P6M2220, dorsal view of complete carapace.

Figs 5-6 - ?*Acratina nostorica* Monostori, 1994. Fig. 5 - Collection number: P6M2221, right lateral view of complete carapace; fig. 6 - Collection number: P6M2222, right lateral view of complete carapace.

Fig. 7 - *Bairdiacypris* sp. B. Collection number: P6M2223, right lateral view of complete carapace.

Figs 8-9 - *Paracypris?* sp. 1. Fig. 8 - Collection number: P6M2224, right lateral view of complete carapace; fig. 9 - Collection number: P6M2225, right lateral view of incomplete carapace.

Fig. 10 - *Ogmoconcha?* sp. A. Collection number: P6M2226, left lateral view of complete carapace.

Fig. 11 - "*Healdia*" sp. A. Collection number: P6M 2227, right lateral view of complete carapace.

Fig. 12 - *Microcheilinella* cf. *venusta* Chen, 1958. Collection number: P6M2228, right lateral view of complete carapace.

Fig. 13 - *Carinaknightina*? sp. A. Collection number: P6M2229, right lateral view of complete carapace

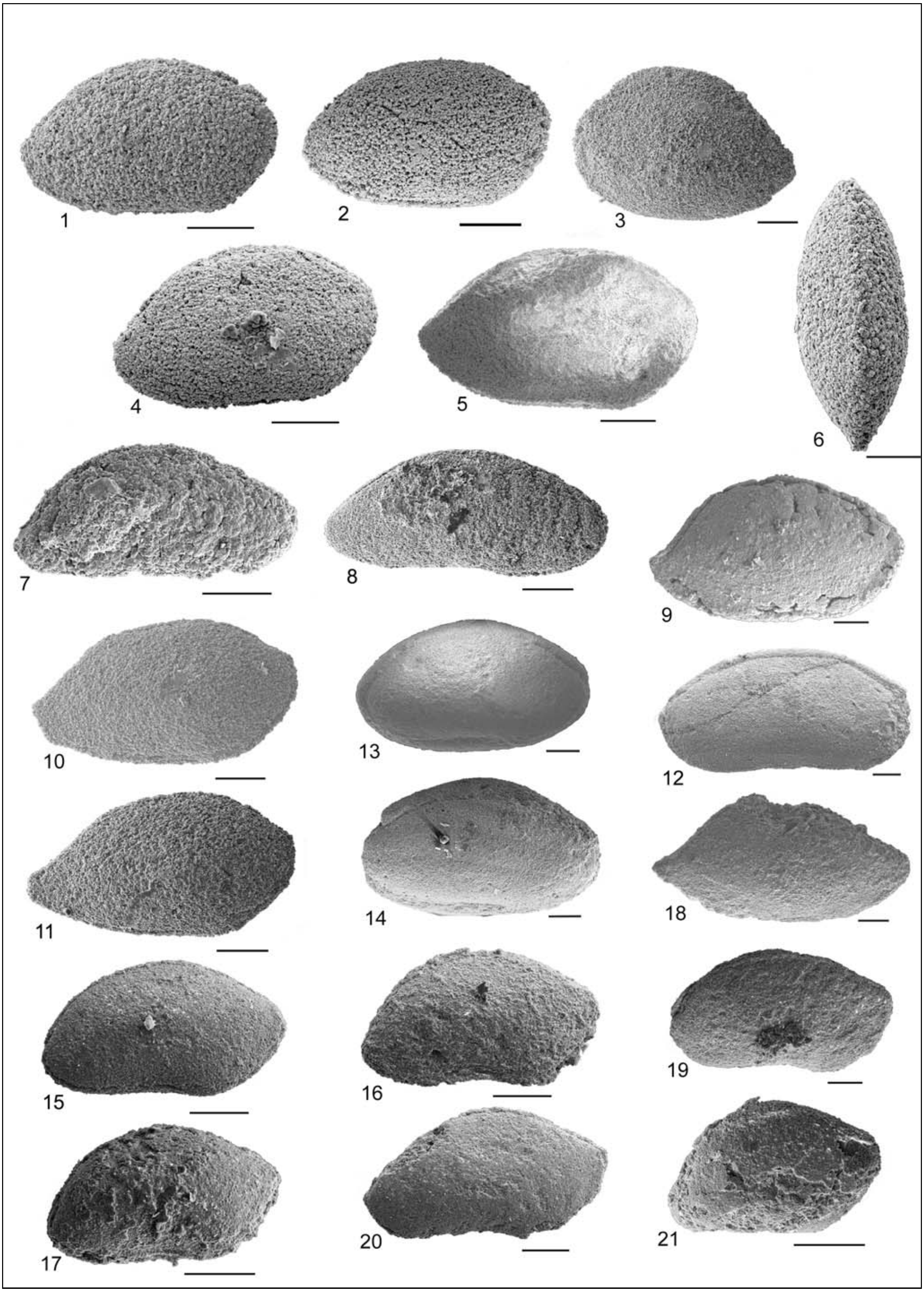


PLATE 1

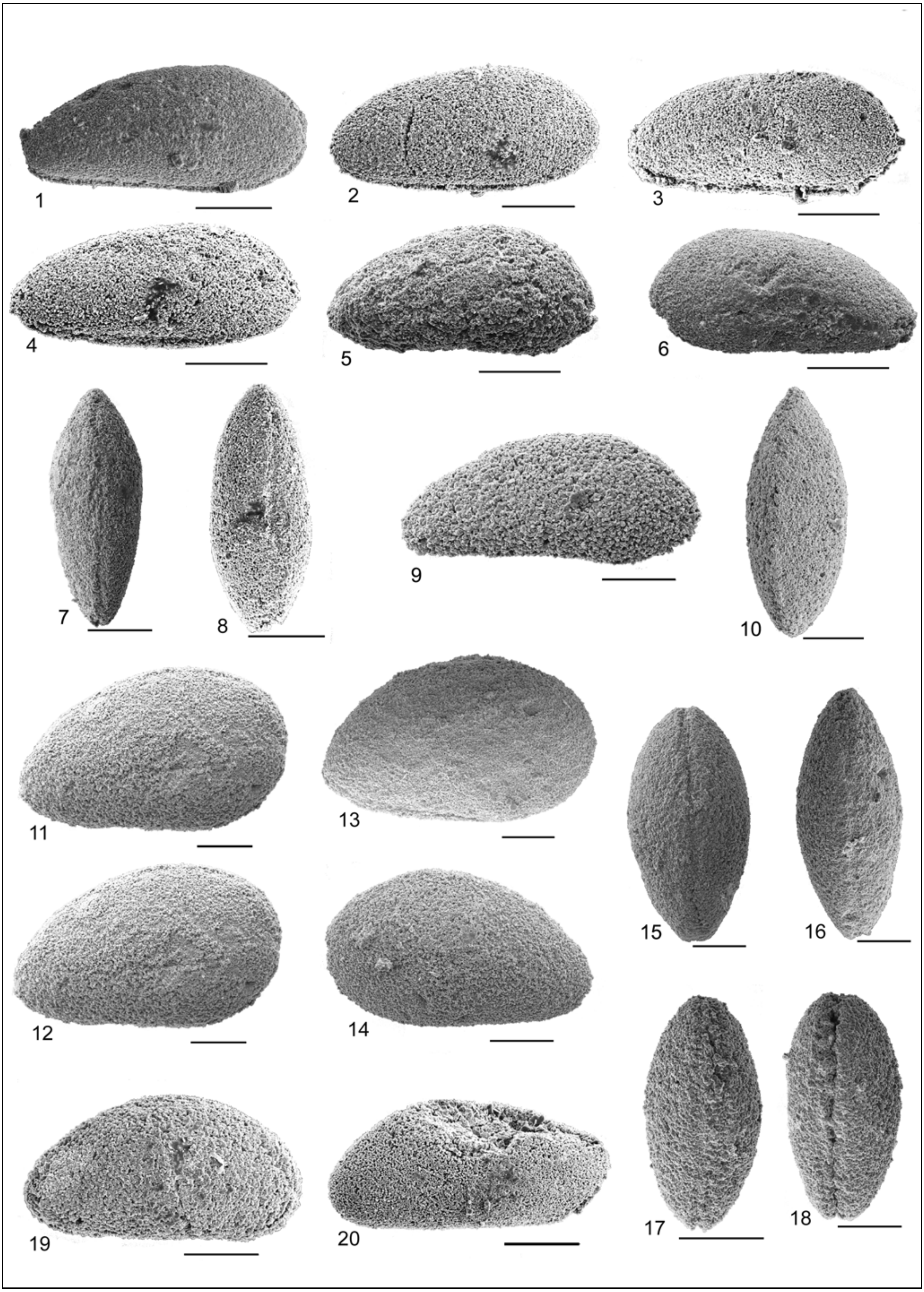


PLATE 2

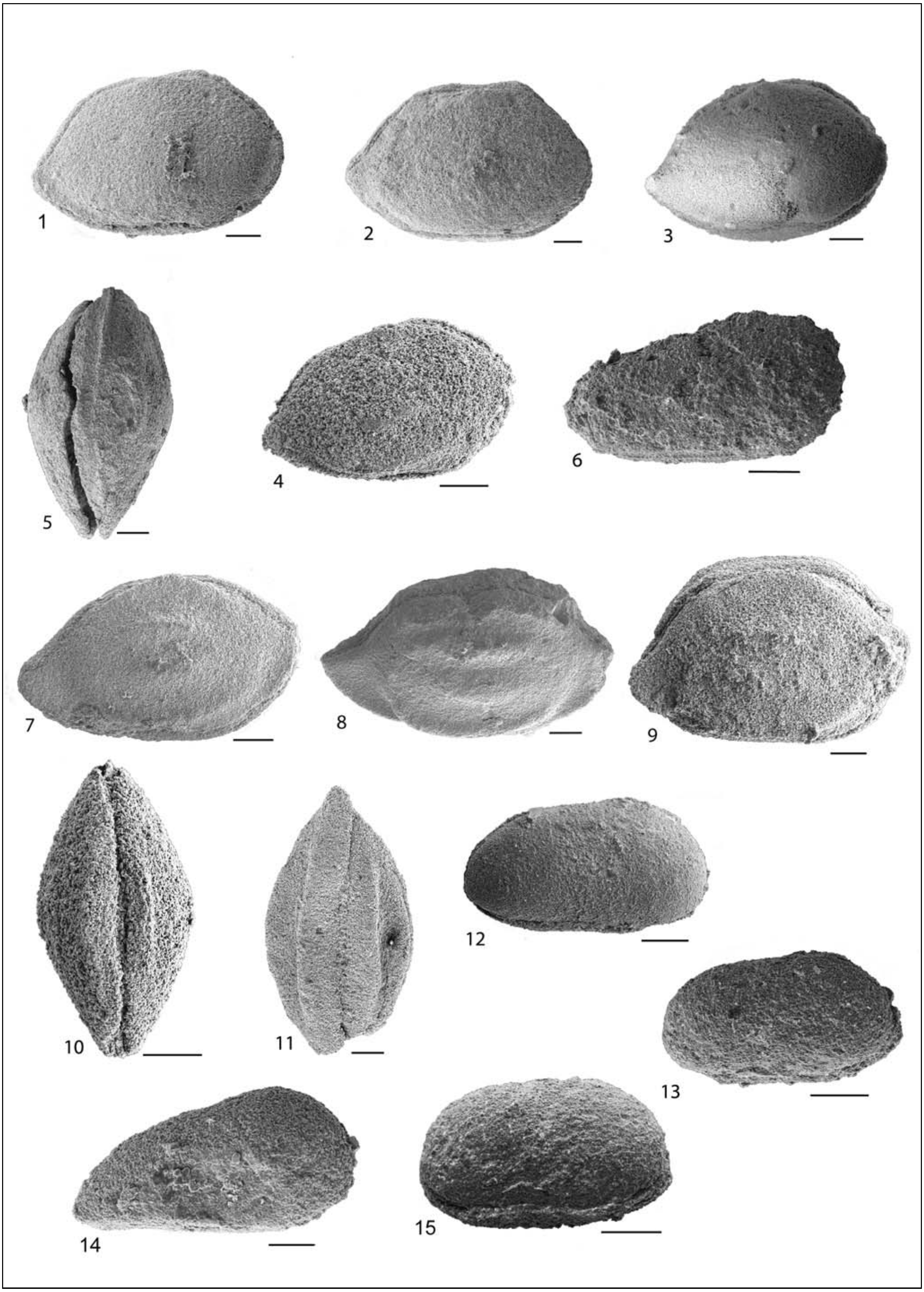


PLATE 3

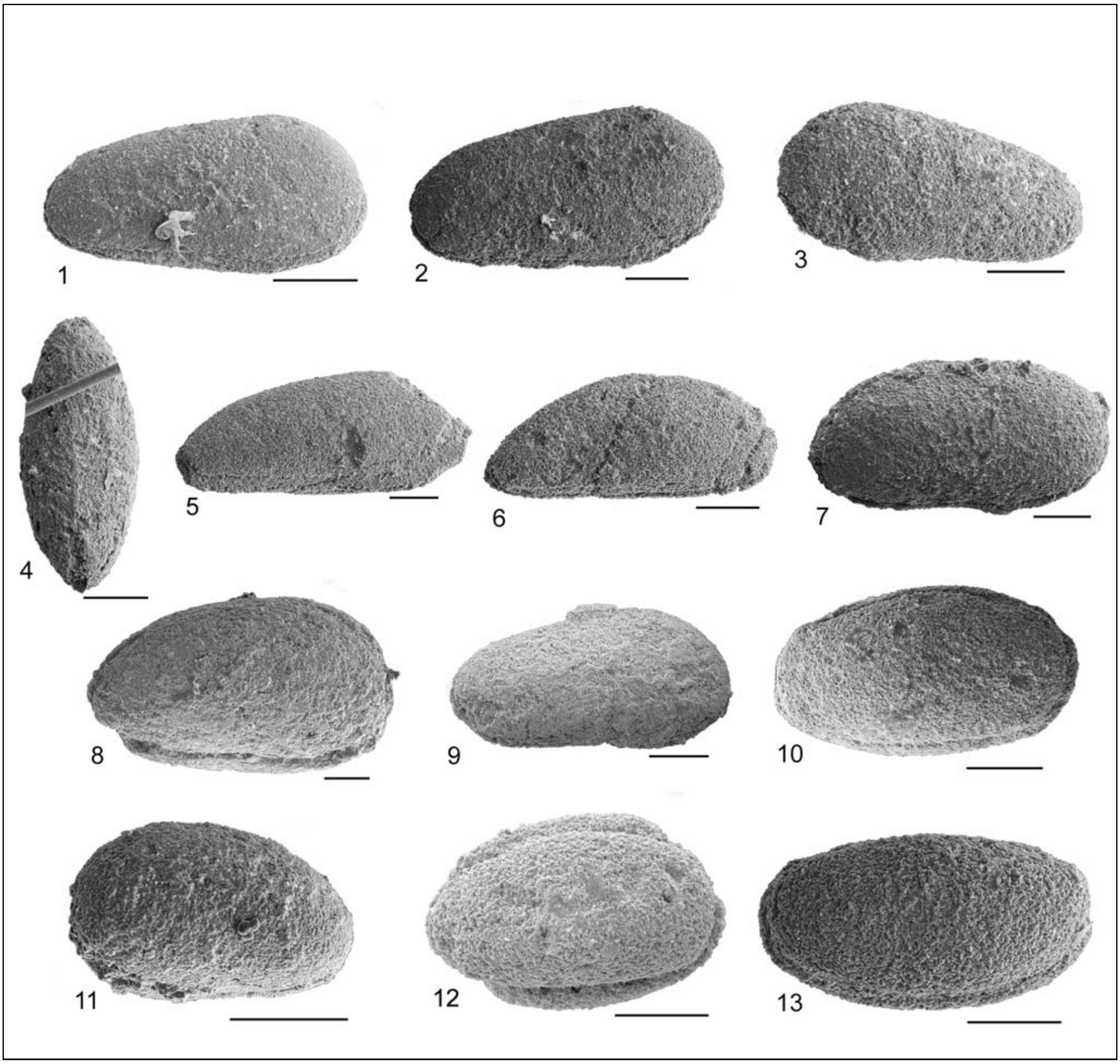


PLATE 4

Hitherto, Dienerian and Smithian ostracods were basically unknown. In the Jinya/Waili section (Fig. 2a,b), we recognized three species in the lower Dienerian (sample W81): *Bairdia fengshanensis* n. sp., *Bairdia wailiensis* n. sp. and *Ptychobairdia luciae* n. sp. These three species show a highly discontinuous distribution, being absent in the Smithian but re-occurring in the Spathian. In the Dienerian-Smithian time interval, and with the noticeable exception of the well-oxygenated *Flemingites* beds, all 13 intervening samples were barren. *Bairdia fengshanensis* n. sp., is documented in the *Flemingites* beds in association with ?*Acratia nostorica* Monostori, 1994, *Bythocypris*? sp. 3, and *Paracypris jinynensis* n. sp. (Fig. 2a,b). Such discontinuous distributions suggest ecological exclusions due to temporarily poorly-oxygenated bottom waters, with the exception of the better oxygenated *Flemingites* beds. A significant rise in ostracod abundance and diversity coincides with the restoration of well-oxygenated bottom waters from the Smithian-Spathian boundary on.

Palaeoecology

Some palaeoecological interpretations can be proposed for the analysed samples. All the ostracod genera encountered recovered from the Jinya/Waili section are typically marine benthic forms.

The main characteristics of genera, families and/or superfamilies could be summarized as follow. The Bairdiacea are present in shallow to deep, open carbonate environments with normal salinity. Ornamented and thick-shelled Bairdiacea are diagnostic of relatively high energy environments. The Kloedenellacea characterize very shallow, euryhaline environments. The genus *Kerocythere* is a shallow marine, euryhaline, and soft substratum dweller. The "simple" Healdiacea, with massive shell and without long spines, appear to be related to shallow infralittoral environments.

All the ostracods reported here are typical for intertropical warm waters.

Some taphonomic informations can be added. Almost all the specimens are represented by closed carapaces. This indicates a limited transportation and/or burying into a soft substratum (Oertli 1971).

The various documented assemblages are predominantly composed quite exclusively of Bairdiacea which are deposit feeders. Only two species are filter feeding ostracods: *Carinaknightina*? sp. in sample JIN90 and "*Healdia*" sp. A in sample W163. According to the Lethiers & Whatley's model (1994), which uses the percentage of filter feeding ostracods in regard of deposit feeders (Fig. 5), we can estimate that, in all the samples with ostracods, the oxygen concentration in the bottom water is about 6-7ml/l. The absence of ostracods in most of the Dienerian and the Smithian samples cannot be easily explained by oxygen concentration. Indeed, ostracods can withstand an important drop of oxygen concentration. In theory, oxygen depletion leads to the progressive replacement of deposit feeders by filter feeding ostracods.

From all these observations, we can deduce that in the ostracod productive samples (i.e. Griesbachian, early Dienerian, Smithian "*Flemingites* beds", and Spathian - Fig. 2a,b), the Early Triassic palaeoenvironments of Fengshan area were open marine, well oxygenated, with epibenthic ostracods dwelling on a soft substratum. On the other hand, absence of ostracods in most of carbonate samples of Dienerian and late Smithian age is compatible with the poorly oxygenated facies characterized by dark, laminated, pyrite-rich micritic limestone devoid of bioturbation.

In this palaeoecological analysis, we take in account only assemblages with more than 50 specimens, i.e. samples W163, W42, W44A, JIN90, W330, JIN206 and JINYTUF2 (Tab. 2). In detail, we can observe that the ostracod assemblage is composed as shown on Fig. 6.

From bottom to top, we can propose the following interpretations of palaeoenvironments.

– *Sample W163* (Griesbachian?): circalittoral, with low energy shallow well oxygenated water. This assemblage is well diversified and does not reflect any stressful condition i.e. no variation of salinity, of temperature and/or of oxygen drop. These observations differ from the general interpretation of microbial limestone deposition, which are considered as opportunistic disaster forms. Our data could be in agreement with two points of view. Wignall & Hallam (1993) argued that extinction of the marine benthos followed the diachronous onset of anoxia, therefore leading to diachronous extinctions. According to Pruss & Bottjer (2004), the Early Triassic stromatolites "formed as reef mounds and level-bottom individual domes, with an overlying template of ecological relaxation. These conditions of ecological relaxation may be interrupted by repeated periods of additional environmental stress, such as incursion of anoxic and/or CO_2 -rich deep-water into shelf environments". The levels where ostracods were recovered could correspond to relaxation periods. It is also important to note that the ostracod assemblage does not show significant differences from Late Permian ones. Data obtained in Early Triassic equivalent strata in Pakistan (Sohn 1970), in Western Taurus (Crasquin-Soleau et al. 2004a, b) and in Eastern Sichuan (Crasquin-Soleau & Kershaw 2005) exhibit exactly the same features: composition similar to Late Palaeozoic assemblages and open marine environments. Twitchett et al. (2004) stated that "the hypothesis that the apparent delay in the recovery after end-Permian mass extinction event was due to widespread and prolonged benthic oxygen restriction and in the absence of anoxia, marine recovery is much faster", a statement which may well apply to our data. But, contrary to those authors, the "pre-extinction fauna" of Late Palaeozoic aspect exists on the borders of Neo-Tethys, at least in South China,

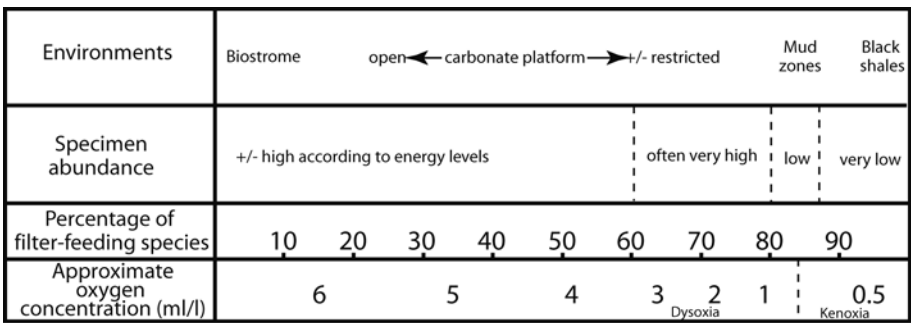


Fig. 5 - Lethiers and Whatley (1994) proxy model of oxygen levels linked to ostracod abundance and type.

Species	nb spec.	samples	Family
Ptychobairdia luciaae n.sp.	++	JINYATUF2	OB
Ptychobairdia aldaae n.sp.			OB
Bairdia fengshanensis n.sp.			B
Bairdia wailiensis n.sp.			B
Bairdia sp.6			B
Bythocypris? sp.B			B
Microcheilinella? sp.1			B
Paracypris jinyaensis n.sp.			B
Ptychobairdia sp.A		Spathian	OB
Bairdia cf. *humilis* Monostori, 1995	++	JIN206	B
Bairdia sp.			B
Bairdiacypris galbruni Crasquin-Soleau & Gradinaru, 1996			B
Liuzhinia guangxiensis n.sp.			B
Ptychobairdia luciaae n.sp.			OB
Ptychobairdia aldaae n.sp.			OB
Bairdiacypris sp.A		Spathian	B
Luizhinia guangxiensis n.sp.	+++	W330	B
Bairdia fengshanensis n.sp.			B
Spinocypris? sp.1		Spathian	B
Bairdiacypris galbruni Crasquin-Soleau & Gradinaru, 1996	++++	JIN90	B
Liuzhinia guangxienis n.sp.			B
Microcheilinella cf. *venusta* Chen, 1958			B
Ptychobairdia luciaae n.sp.			OB
Ptychobairdia aldaae n.sp.			OB
Bairdia (Urobairdia) angusta recta Monostori, 1995			B
Bairdia fengshanensis n.sp.			B
Carinaknightina? sp.		Spathian	K
Luizhinia guangxiensis n.sp.	+	W324 Spathian	B
Bairdiacypris galbruni Crasquin-Soleau & Gradinaru, 1996	++	W44A	B
Liuzhinia guangxiensis n.sp.			B
Liuzhinia cf. *parva* Wei Ming, 1981			B
?*Spinocypris vulgaris* Kozur, 1971			B
Bairdia finalyi (Méhes, 1911)			B
Paracypris jinyaensis n.sp.		Spathian	B
Ogmoconcha ? sp.A			C
Bairdia finalyi (Méhes, 1911)	++	W42	B
Bairdia wailiensis n.sp.			B
Bairdiacypris galbruni Crasquin-Soleau & Gradinaru, 1996			B
Liuzhinia cf. *parva* Wei Ming, 1981			B
Liuzhinia guangxiensis n.sp.		Spathian	B
Liuzhinia cf. *parva* Wei Ming, 1981	+	W35 Spathian	B
Bairdia fengshanensis n.sp.	+	W30B	B
Bythocypris sp.A		Spathian	B
Bairdia anisica Kozur, 1970	+	W18 Spathian	B
?*Acratina nostorica* Monostori, 1995	+	W80	B
Bairdia fengshanensis n.sp.			B
Paracypris jinyaensis n.sp.		Smithian	B
Paracypris jinyaensis n.sp.	+	J291	B
Bythocypris? sp.3		Smithian	B
Bairdia fengshanensis n.sp.	+	W81	B
Bairdia wailiensis n.sp.			B
Ptychobairdia luciaae n.sp.		Dienerian	OB
Bairdia wailiensis n.sp.	++	W163	B
Bairdia sp.A			B
Bairdia sp.B			B
Bairdia sp.C			B
Bairdia sp.7			B
Bairdia sp. indet.			B
Gen et sp. indet			?
Bairdiacypris sp.B			B
Bairdiacypris sp.			B
Paracypris gaetanii n.sp.			B
Paracypris? sp.1			B
Kerocythere sp.A			C
Liuzhinia antalyaensis Crasquin-Soleau, 2004			B
"*Healdia*" sp.A		Griensbachian?	H

Tab. 2 - Ostracod composition per sample with superfamily attribution.
++++: more than 300 specimens; +++: 100 to 300 specimens; ++: 50 to 100 specimens; +: less than 50 specimens; B: Smooth Bairdiacea; OB: ornamented strong shelled Bairdiacea; K: Kloedenellacea; H: Healdiacea; C: Cytheracea (Kerocytheridae); ?: undetermined

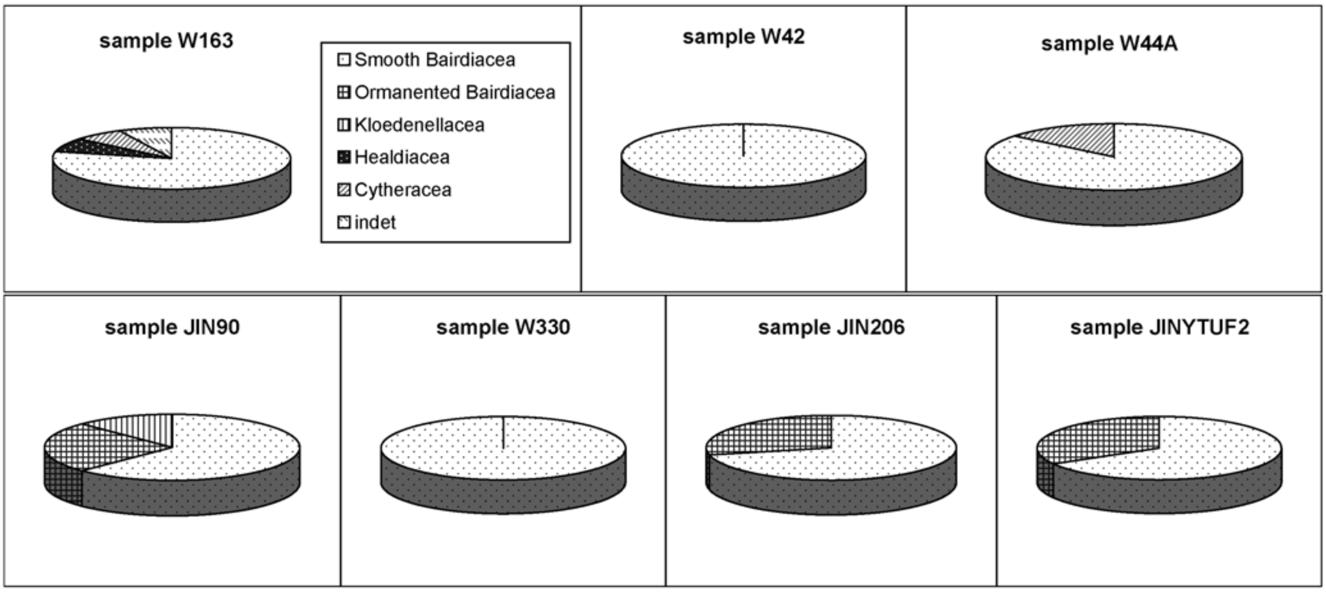


Fig. 6 - Composition (number of species per superfamily) of ostracod assemblages for the seven samples which yielded more than 50 specimens.

Tibet, and Western Taurus. The turnover of ostracod faunas took place later in the Early Triassic (Crasquin-Soleau et al., submitted).

– *Sample W42* ("*Tirolites* beds" - Early Spathian): open marine, external platform, stenohalin environment, low energy depositional setting.

– *Sample W44A* ("*Tirolites* beds" - Early Spathian): circalittoral with low energy well oxygenated shallow water.

– *Sample JIN90* ("*Fengshanites* beds" - Middle Spathian): internal part of circalittoral zone, maybe with variations of salinity, moderate energy well oxygenated water; this level could be the shallowest among the studied samples.

– *Sample W330* ("*Fengshanites* beds" - Middle Spathian): open marine, external platform, stenohaline environment and low energy depositional setting.

– *Sample JIN206* ("*Hellenites* beds" - Late Spathian): open marine, external platform, stenohaline environment, moderate energy depositional setting.

– *Sample JINTUF2* (Haugi Zone - Late Spathian): open marine, external platform, stenohaline environment, and moderate to high energy depositional setting.

Conclusions

The ostracods discovered in Jinya/Waili section (Guangxi Province, South China) allow a significant progress in the knowledge of Early Triassic ostracod faunas. Seven new species are described among thirty seven recognized throughout this Early Triassic section.

– With its Permian stamp, the Griesbachian ostracod assemblage remains well diversified and suggests a well oxygenated open marine environment, without any obvious indication of ecological stress on the ostracod community. Griesbachian assemblages are similar to Late Palaeozoic ones. Late Palaeozoic pre-extinction fauna exists on the borders of Neo-Tethys, at least in South China, Tibet, and Western Taurus. Even if the Permian - Triassic events destroy at least 95% of ostracods fauna, the Mesozoic turn-over in this group takes place later in the Early Triassic.

– Dienerian and Smithian ostracods are recorded for the first time.

– Intermittent poorly oxygenated bottom waters during most of the Dienerian and the late Smithian coincide with the local non occurrence of ostracods.

– A significant increasing in abundance and diversity of ostracods occurs from the Smithian-Spathian boundary onward, which corresponds to the withdrawal of anoxic bottom waters

– The palaeoenvironmental interpretation of ostracod assemblages suggests a warm open, well oxygenated, marine depositional setting, recording also small variations of energy and bathymetry.

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