



**HAL**  
open science

**Late Carnian (Tuvalian, Tropites dilleri zone) ostracods  
(Crustacea) from the Mufara Formation (Monte  
Scalpello, Central-Eastern Sicily, Italy)**

Sylvie Crasquin, Francesco Sciuto, Agatino Reitano

► **To cite this version:**

Sylvie Crasquin, Francesco Sciuto, Agatino Reitano. Late Carnian (Tuvalian, Tropites dilleri zone) ostracods (Crustacea) from the Mufara Formation (Monte Scalpello, Central-Eastern Sicily, Italy). *Annales de Paléontologie*, 2018, 104 (2), pp.129-142. 10.1016/j.annpal.2018.03.001 . hal-02108580v2

**HAL Id: hal-02108580**

**<https://hal.science/hal-02108580v2>**

Submitted on 17 Dec 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

1 Late Carnian (Tuvalian, *Tropites dilleri* zone) ostracods (Crustacea) from the Mufara  
2 Formation (Monte Scalpello, Central-Eastern Sicily, Italy).

3 Sylvie Crasquin<sup>1</sup>, Francesco Sciuto<sup>2</sup>, Agatino Reitano<sup>3</sup>

4

5 <sup>1</sup> Sylvie Crasquin CR2P - CNRS, MNHN, Sorbonne Université, 4 Place Jussieu, T. 46-56, E.5, F-  
6 75252, Paris cedex 05, France. E-mail: [sylvie.crasquin@upmc.fr](mailto:sylvie.crasquin@upmc.fr). <sup>2</sup> Francesco Sciuto,

7 Palaeoecological Research Group, Department of Biological, Geological and Environmental  
8 Science, Catania University, Corso Italia, 55, Catania 95129, Italy. E-mail: [fsciuto@unict.it](mailto:fsciuto@unict.it). Tel.

9 +39957195769. <sup>3</sup> Agatino Reitano, Natural History Museum, via degli Studi 9, 97013 Comiso  
10 (Ragusa), Italy. E-mail: [tinohawk@yahoo.it](mailto:tinohawk@yahoo.it).

11

## 12 **Abstract**

13 Ostracod association from the Upper Triassic (*Tropites dilleri* zone of the Carnian stage) of  
14 the sedimentary succession (Mufara Formation) exposed along the east side of Monte Scalpello  
15 (Catenanuova, central eastern Sicily) have been studied for the first time. The specimens, silicified,  
16 are rare but well preserved and often consist of complete carapaces. They belonging to eight  
17 families: Healdiidae, **Cavellinidae**, Bairdiidae, Acratiidae, Bythocyprididae, Pontocyprididae,  
18 Judahellidae, Glorianellidae.

19 Twenty - three taxa have been listed; the family Bairdiidae is the most represented among all  
20 the others with fifteen species. Four species are new: *Bairdia scaliae* n. sp., *Acratia maugerii* n. sp.,  
21 “*Anchistrocheles*” *gemellaroi* n. sp. and *Judahella?* *montanarii* n. sp. Other species are left in  
22 open nomenclature because of the lack of specimens.

## 23 **Résumé**

24 L'association d'ostracodes de la succession sédimentaire du Trias supérieur (Carnien,  
25 *Tropites dilleri* zone, Mufara Formation) affleurant du côté oriental du Monte Scalpello  
26 (Catenanuova, Sicile centre-orientale) a été étudiée pour la première fois. Les spécimens, silicifiés,

27 sont rares mais bien conservés et se composent souvent de carapaces complètes. Les espèces  
28 appartiennent à huit familles: Healdiidae, **Cavellinidae**, Bairdiidae, Acratiidae,  
29 Bythocyprididae, Pontocyprididae, Judahellidae, Glorianellidae. La famille Bairdiidae est la plus  
30 représentée avec quinze espèces sur les vingt-trois répertoriées. Quatre espèces sont nouvelles:  
31 *Bairdia scaliai* n. sp., *Acratia maugeri* n. sp., "*Anchistrocheles*" *gemmellaro* n. sp. et *Judahella?*  
32 *montanarii* n. sp. D'autres espèces sont laissées en nomenclature ouverte.

33 **Keywords:** Ostracods: Late Triassic, Neo-Tethys, Central-Eastern Sicily, Mount Scalpello, Mufara  
34 Formation, palaeoenvironmental reconstruction, new species.

35 **Mots-clefs:** Ostracodes: Trias supérieur, Néotéthys, Sicile centre-orientale, Mont Scalpello,  
36 Formation Mufara, paléoenvironnement, nouvelles espèces.

37

## 38 1. INTRODUCTION

39 After the first studies on Mesozoic sediments cropping out in the Monte Scalpello area  
40 carried out since the early 19th century ([Calcara, 1840, 1845](#); [Nelli, 1899a, b](#); [Marinelli, 1899](#);  
41 [Gemmellaro, 1860, 1904](#)), the Upper Triassic fauna of "Clay-calcareous-arenaceous alternation"  
42 ("Flysch Carnico" *Auct.*), best referring to the "Mufara Formation" ([Schmidt di Friedberg and](#)  
43 [Trovò, 1962](#)) of the "Monte Judica Group" (Scalia, 1909) have been the subject of numerous  
44 palaeontological detailed studies on invertebrates: the molluscs have been studied by [Scalia \(1907,](#)  
45 [1909, 1910, 1912, 1914\)](#), the cnidaria by [Maugeri Patanè \(1934\)](#), the ammonites by [Lentini \(1974\)](#),  
46 the foraminifers, chaetetids, sphinctozoans and other organisms by [Carrillat and Martini \(2009\)](#).

47 So far, ostracods (Crustacea) coming from the Mufara Formation in the Monte Scalpello  
48 area never have been studied; the only references to these organisms are found in [Lentini \(1974\)](#)  
49 which refers about a high level of the Mufara Formation rich in *Bairdiidae* and in [Carrillat and](#)  
50 [Martini \(2009\)](#) which cite, only the presence of this organisms.

51 The present paper, therefore, wants to be a first contribution to the knowledge of the  
52 ostracod fauna of the Mufara Formation clays outcropping in the Monte Scalpello area.

53 Furthermore, this analysis is an important step in the knowledge of the recovery of ostracod fauna  
54 after the Permian – Triassic massive extinction. The data on Middle and early Late Triassic are rare.

55

## 56 **2. MATERIALS AND METHODS**

57 Monte Scalpello is located (Fig. 1) in central eastern Sicily in the right side of Dittaino  
58 River

59

60 Fig. 1. Geographical location of the sampling area. Localisation géographique de la zone d'étude.

61

62 to the south east of the town of Catenanuova (EN), 40 Km west of Catania (F 633 IV NO of the  
63 Carta d'Italia alla scala 1: 25.000). It is inserted, as part of the “Monte Judica Units” (Lentini, et  
64 al., 1987), along the northern margin of the Gela Foredeep, in the geodynamic context (Fig. 2) of  
65 the southern end of Fig. 2. Structural scheme of the central Mediterranean area with the location of the study area  
66 (after Grasso, 2001 modified). Schéma structural de la Méditerranée centrale avec la localisation de la zone d'étude  
67 (d'après Grasso, 2001 modifié).

68

69 the Maghrebian – Sicilian-Southern Apennine nappes and as such, it would dwarf the mildly  
70 folded foreland (Hyblean Plateau) (Lentini et al., 1987; Grasso, 2001 inter alias).

71 The Monte Scalpello area is lithologically characterized by a Mesozoic-Cainozoic sediments  
72 complex belonging to the so-called Imerese Succession (Lentini et al., 1987; Montanari, 1987; inter  
73 alias) or Imerese-Sicano Succession (Carrillat and Martini, 2009; Di Paolo et al., 2012). This  
74 sedimentary succession settled inside the pelagic Imerese Basin which had formed during the Meso-  
75 Cenozoic extensional phases and which was delimited by the Panormide Carbonate Platform to the  
76 west and the Trapanese Carbonate Platform to the east and to the south (Fig. 3) (Catalano and  
77 D'Argenio, 1982; Montanari, 1987; Speranza and Minelli, 2014).

78



79 Fig. 3. Schematic palaeogeographic reconstruction of Pangaea and Neo-Tethys in Late Triassic times (after Speranza &  
80 Minelli (2014), Golonka, 2007 and Preto et al., 2010 modified). Reconstruction paléogéographique schématique de la  
81 Pangée et de la Néo-Téthys à la fin du Trias (d'après Speranza & Minelli, 2014; Golonka, 2007 et Preto et al., 2010  
82 modifié).

83

84 The Imerese Basin, therefore, is represented by the transitional pelagic facies between the  
85 Panormide and Trapanese shelf facies, on the one hand, and the bathyal facies of the Neo-Tethys,  
86 on the other (Fig. 3).

87 The Imerese succession of Monte Scalpello (Fig. 4) starts with the “Carnian Flysh”  
88 (Auctorum) or, according to [Schmidt di Friedberg and Trovò \(1962\)](#), the Mufara Formation. This  
89 unit, outcropping in the southern slopes of the mount, is prevalently constituted by dark grey clays  
90 rich in ammonites with rare interbedded levels of fossiliferous calcarenites and fibrous calcite with  
91 *Halobia* spp. imprints.

92

93 Fig. 4. Geological map of the Monte Scalpello area (after Lentini, 1974 and Di Paolo et al. 2012, modified). Carte  
94 géologique de la région de Monte Scalpello (d'après Lentini, 1974 and Di Paolo et al. 2012, modifié).

95

96 The detailed stratigraphic attribution of Mufara Formation has been the subject of different  
97 opinions since the beginning of the twentieth century; [Calcara, 1841, 1845](#); [Nelli \(1899a, b\)](#),  
98 [Gemmellaro \(1904\)](#), [Scalia \(1907; 1909; 1910 – 1914\)](#), [Maugeri Patanè \(1934\)](#), [Lentini \(1974\)](#) and  
99 [Dal Sasso et al. \(2014\)](#) assigned these sediments to the Late Triassic (Carnian).

100

101 [Fig. 5. Carnian Ammonoid zones. \(After Lucas, 2010\). Zones à Ammonoïdés du Carnien \(d'après Lucas,](#)  
102 2010)

103

104 [Lentini \(1974\)](#), on the basis of the ammonites fauna found, attributes the lowest levels of  
105 Monte Scalpello section, to the *Trachyceras aonoides* ammonite zone of the Early Carnian;

106 nevertheless the presence of *Tropitidae* among the specimens coming out from this levels, excludes  
107 that this formation belongs to the Early Carnian (Lucas, 2010; Jenks et al., 2015).

108 The subsequent sedimentary layers are attributed, again by Lentini (1974), to the *Tropites*  
109 *subbullatus* zone; nevertheless the contemporary presence of specimens of *Trachyceratidae*  
110 (?*Neoprotrachyceras*, *Trachysagenites*, *Pamphagosirenites*) found by the authors of the present  
111 paper, and specimens of *Tropitidae*, suggests that both this fossiliferous horizons can be referred to  
112 the *Tropites dilleri* zone (Lucas, 2010; Jenks et al., 2015). A confirmation of this datum comes from  
113 Carrillat and Martini (2009) who, mostly on the basis of the foraminifers, refers the same clays of  
114 Mufara Formation outcropping at Monte Gambanera, nine kilometers to the south of the studied  
115 area, to the upper part of the Late Carnian (*Tropites subbullatus*/*Anatropites spinosus* zones).  
116 According to Jenks et al. (2015) the base of Tuvalian Substage (upper part of the Carnian Stage) is  
117 characterized by the appearance and radiation of the *Tropitidae*. Therefore the presence of  
118 *Tropitidae* reported already by Gemmellaro (1904), Scalia (1909) and Lentini (1974) remove all  
119 doubts about the attribution of this sedimentary levels out cropping, to the Tuvalian substage (Late  
120 Carnian, *Tropites dilleri* zone) (Fig. 5).

121 Over the Mufara Formation follow conformably the Upper Triassic cherty limestone with  
122 *Halobia*, the Jurassic - Cretaceous radiolarian cherts and unconformably the Eocene - Oligocene  
123 limestone ("Scaglia"). The stratigraphic sequence is finally closed by Oligocene - Miocene clays  
124 and glauconitic sandstones.

125 For the present work twenty kilograms of sediments were collected from one stratigraphic  
126 level of the Mufara Formation cropping out in contrada Paraspora, two hundred meters southwest  
127 of Masseria Mannino (37°32'56.86''N; 14°40'30.64''E) along the east side of Monte Scalpello,  
128 (Figs. 1, 4). Sediments were routinely washed, dried in oven and sieved. Then, ostracod specimens  
129 were picked out from the > 63µm fraction. The ostracod specimens were examined and measured  
130 under a stereomicroscope, then photographed under an LMU Tescan Vega II SEM. The material is  
131 housed in the Palaeontological Museum of the University of Catania. The repository number of the

132 holotypes and the paratypes are given in the systematic descriptions.

133

134

### 135 **3. RESULTS**

136 The sample taken results to be constituted mostly by pelitic sediments, indeed almost the  
137 entire sediment is passed over the 63µm sieve. The poor washing residue (about 100 grams)  
138 provided in order of abundance, gastropods, brachiopods, bivalves and crinoids, echinoids skeletal  
139 fragments and small size ammonites. Microfauna is very poor in foraminifers represented  
140 prevalently by the genera *Glomospira* and *Hemidiscus*; ostracods, the majority of which is  
141 constituted by juvenile forms, are relatively abundant.

142

143

#### 144 **Systematic palaeontology**

145 Ostracods from a sample of clay of the Mufara Formation taken at the base of Monte  
146 Scalpello are systematically listed. The specimens belong to the Order Metacopida Sylvester-  
147 Bradley, 1961 and Podocopida Sars, 1866, and eight families Healdiidae Harlton, 1933,  
148 Cavellinidae Egorov, 1950, Bairdiidae Sars, 1866, Acratiidae Gründel, 1962, Bythocyprididae  
149 Maddocks, 1969, Pontocyprididae Müller, 1894, Judahellidae Sohn, 1968, Glorianellidae Snejder,  
150 1960.

151 Abbreviations. L: length; H: height; T: thickness; RV: right valve; LV: left valve; DB:  
152 dorsal border; VB: ventral border; AB: anterior border; PB: posterior border; PVB: postero-ventral  
153 border; AVB: antero-ventral border; PDB: postero-dorsal border; PVB: postero-ventral border.

154

155 Class Ostracoda Latreille, 1806

156 Order Metacopida Sylvester-Bradley, 1961

157 Suborder Metacopina Sylvester-Bradley, 1961

158 Superfamily Healdioidea Harlton, 1933

159 Family Healdiidae Harlton, 1933

160 Genus *Ogmoconchella* Gründel, 1964 emend Michelsen, 1975

161 Type species: *Healdia aspinifera* Drexler, 1958

162 *Ogmoconchella felsooersensis* (Kozur, 1970)

163 Fig. 6 a - b

164 1970 *Healdia* (*Healdia*) *felsooersensis* n. sp. - Kozur, p. 409, pl. 3, fig. 13, pl.4, figs; 1 - 6

165 1995 “*Hungarella*” *felsooersensis* (Kozur, 1970) – Monostori, p. 40 - 41, pl. 1, figs. 2 - 4

166 1996 *Healdia* (*Healdia*) *felsooersensis* Kozur, 1970 - Crasquin-Soleau and Gradinaru, pl. 9,

167 fig. 14

168 2013 *Healdia* (*Healdia*) *felsooersensis* Kozur, 1970 - Sebe et al., pl. 4, fig. 14

169 2013 *Hungarella problematica* (Méhés, 1911) - Monostori and Toth, p. 308, Pl. 4, Figs. 14 -

170 17

171 **Material:** 2 complete carapaces.

172 **Dimensions** (figured specimen): L= 790-810 µm; H= 580 µm; T= 380 µm.

173 **Stratigraphic and geographic range:** Early Anisian of Felsőörs, Balaton Highland,

174 Hungary (Kozur, 1970, Monostori, 1995), Early Anisian of Dobrogea, Romania (Sebe et al., 2013),

175 Late Carnian (*Tropites dilleri* zone), Mufara Formation outcropping in the east side of Monte

176 Scalpello (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy (this work).

177 **Remarks:** A great confusion exists in the systematics of Late Permian – Triassic Healdiidae  
178 genera *Hungarella* – *Ogmoconcha* – *Ogmoconchella*.

179 Some authors consider *Hungarella* Méhés, 1911 (which has not type material –Monostori,  
180 1995, p. 40) and *Ogmoconcha* Triebel, 1941 as synonyms (Moore, 1961; Anderson, 1964). Shaver (*in*  
181 Moore 1961) and Sohn (1968) don't agree with this synonymy. In fact the two genera are extremely

182 close. The third genus *Ogmoconchella* was introduced by [Gründel \(1964\)](#) and emended later by  
183 [Michelsen \(1975\)](#) mainly on the presence of a spine at PVB. We use here this character to attribute the  
184 species *felsooersensis* to *Ogmoconchella*.

185

186 Genus *Healdia* Roundy, 1926

187 Type species *Healdia simplex* Roundy, 1926

188 *Healdia?* sp.

189 Fig. 6 c - d

190 **Material:** 2 complete carapaces.

191 **Dimensions:** fig. 6c:L = 660 µm; H = 580 µm; fig.6d: L= 680 µm, T = 310 µm.

192 **Stratigraphic and geographic ranges:** Late Carnian (*Tropites dilleri* zone), Mufara

193 Formation outcropping in the east side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E),

194 Sicily, Italy (this work).

195 **Remarks:** In right lateral view, the carapace has all the characteristics of the genus *Healdia*.

196 However the dorsal view is very far from this genus. Indeed, here the carapace is biconvex with a

197 maximum of thickness at mid-L (in *Healdia* genus the posterior part of the carapace is truncated)

198 and here there is only one spine at RV (in *Healdia* genus spines are present at PVB of both valves)

199 As far as the muscle scars cannot be observed, the figured specimens are dubiously attributed to the

200 genus *Healdia*.

201 Superfamily Cavellinoidea Egorov, 1950

202 Family Cavellinidae Egorov, 1950

203 Genus *Bektasia* [Özdikmen, 2010](#)

204 Type species. *Reubenella avnimelechi* [Sohn, 1968](#)

205 *Bektasia* sp.1

206 Fig. 6 e

207 **Material:** 1 carapace.



233 **Stratigraphic and geographic range:** Early Carnian of South Tirol, Italy ([Kristan-](#)  
234 [Tollmann, 1976; 1978](#)), Late Carnian (*Tropites dilleri* zone; this work), Rhaetian of Austrian Alps  
235 ([Kristan-Tollmann, 1970](#)) and Central Iran ([Kristan-Tollmann, 1979](#)).

236 **Remarks:** the Triassic genus *Hiatobairdia* [Kristan-Tollmann, 1970](#) and the Permian genus  
237 *Kempfina* Crasquin, 2010 (in [Crasquin et al., 2010](#)) differ from other bairdiidae by the “acratian  
238 beak” at AVB, and the two symmetric valves. The surface of the carapace is often punctuated.

239 *Hiatobairdia subsymmetrica* is characterized by its fine ridge underling the VB, a H/L = 0.53 –  
240 0.56; the dorsal outline biconvex and the regularly punctuated carapace.

241

242 Genus *Bairdia* M'Coy, 1844

243 Type species *Bairdia curta* M'Coy, 1844

244 *Bairdia cf. humilis* Monostori, 1995

245 Fig. 6 i - j

246

247 **Material:** 2 complete carapaces

248 **Dimensions:** specimen figured in fig. 6 i: L = 1280 µm; H = 580 µm

249 **Stratigraphic and geographic range:** Late Carnian (*Tropites dilleri* zone). Mufara

250 formation outcropping in the east side of Monte Scalpello (Lat. 37°32'56.86''N; Long.

251 14°40'30.64''E), Sicily, Italy (this work)

252 **Remarks:** The present specimens differ from *Bairdia humilis* [Monostori, 1995](#) from Late  
253 Anisian of Balaton Highland, Hungary, only by a radius of curvature of AB a little larger here.

254

255 *Bairdia cf. deformata* [Kollmann, 1963](#)

256 Fig. 6 k - l

257 **Material:** 2 carapaces

258 **Dimensions:** specimen figured in fig. 6 k: L = 910 µm; H = 622 µm





284 *dilleri* zone); Mufara Formation outcropping in the east side of Monte Scalpello (37°32'56.86''N;  
285 14°40'30.64''E), Sicily, Italy (this work)

286

287

288 ***Bairdia* sp. 1**

289 Fig. 6 n - o

290 **Material:** 2 carapaces

291 **Dimensions:** L = 830 µm; H = 480 µm

292 **Stratigraphic and geographic range:** Late Carnian (*Tropites dilleri* zone), Mufara

293 Formation of east side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy (this  
294 work).

295

296 ***Bairdia balatonica* Méhes, 1911**

297 Fig. 6 p

298 1911 *Bairdia balatonica* n. sp. - Méhes, p. 13 - 14, pl. 1, figs. 8 - 11

299 1911 *Bairdia badayi* n. sp. - Méhes, p. 17 - 18, pl. 1, figs. 29 - 30

300 ?1965 *Bairdia balatonica* Méhes var. 1911 - Széles, p. 414, fig. 4

301 1965 *Bairdia dadayi* Méhes, 1911 - Széles, p. 412 - 413, fig. 1

302 1978 *Bairdia* cf. *balatonica* Méhes - Kristan-Tollmann, p. 81, pl. 1, figs. 1 - 3

303 1995 *Bairdia balatonica* Méhes, 1911 - Monostori, p. 42, pl. 2, fig. 1 (non figs. 2 and 3)

304 2011 *Bairdia balatonica* Méhes, 1911 - Forel and Crasquin, p. 252, fig. 5 A

305 2013 *Bairdia balatonica* Méhes, 1911 - Monostori and Tóth, p. 309, figs. 1 - 5

306 **Material:** 1 carapace

307 **Dimensions:** L = 860 µm; H = 545 µm

308 **Stratigraphic and geographic range:** Spathian - Anisian of South Tibet (Forel and

309 Crasquin, 2011), Anisian (Monostori, 1995), Ladinian (Monostori and Tóth, 2013) and Early

310 Carnian (Méhes, 1911; Széles, 1965;) of Hungary, Early Carnian of Southern Alps, Italy (Kristan-  
311 Tollmann, 1978), Late Carnian (*Tropites dilleri* zone). Mufara Formation outcropping in the east  
312 side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy (this work)

313

314 ***Bairdia scaliai* n.sp.**

315 Fig. 6 q - r

316 **Etymology:** The species is named in memory of Salvatore Scalia (1874-1923),  
317 palaeontologist at Catania University, for his scientific engagement in the Mesozoic fauna of Monte  
318 Scalpello.

319 **Material:** four complete carapaces.

320 **Holotype:** complete carapace figured in Fig. 6 r (PMC. O 17 H 11/4/2017), dimensions: L =  
321 740 µm; H = 445 µm

322 **Paratype:** complete carapace figured in Figure 5 q (PMC. O 65-67 P 10/4/2017).

323 **Type locality:** East side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E),  
324 Catenanuova, Sicily, Italy

325 **Type horizon:** Late Carnian (*Tropites dilleri* zone) in the dark grey clays of the Mufara  
326 Formation.

327 **Diagnosis:** A species of *Bairdia* with compact carapace AB with large radius of curvature,  
328 PB short, with small radius of curvature and maximum of curvature located high, all dorsal parts  
329 regularly arched, strong overlap at DB.

330 **Description:** Carapace compact (H/L = 0.57 – 0.58); DB regularly arched with PDB, DB  
331 and ADB in a regular arc of a circle at LV, ADB slightly concave at RV; AB with large radius of  
332 curvature with maximum of curvature located a little below mid - H, a very fine ridge underlines the  
333 AB; VB quite horizontal to very slightly concave; PB short, with very small radius of curvature and

334 maximum of curvature located around lower 1/3 of H, presence of the very thin ridge along the PB;  
335 bairdiid beak poorly expressed but present; strong overlap of LV on RV along all the dorsal margin  
336 with maximum at DB; overlap weak on all other parts of the carapace; surface smooth.

337 **Remarks:** This species is quite different from all the other species recognized in the  
338 Triassic. It could be compared to *Bairdia jeancharlesi* Forel, 2011 from the Smithian – Anisian of  
339 Tibet (Forel and Crasquin, 2011) but here the PB is shorter and the AB has a larger radius of  
340 curvature. *Bairdiacypris triassica* Kozur, 1971 from Late Anisian of Hungary (Kozur, 1971) has the  
341 same radius of curvature at PB and AB but L is really greater.

342 **Stratigraphic and geographic range:** Late Carnian of Sicily, Italy.

343  
344 *Bairdia cf. finalyi* (Méhes, 1911)

345 Fig. 6 s

346 **Material:** 2 carapaces

347 **Dimensions:** figured specimen L = 858 µm; H = 570 µm

348 **Stratigraphic and geographic range:** Late Carnian (*Tropites dilleri* zone). Mufara  
349 Formation in the east side of Monte Scalpello; (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy (this  
350 work).

351 **Remarks:** The present specimens are very close to *Bairdia finalyi* (Méhes, 1911) from the  
352 Smithian – Ladinian of Balaton Highland, Hungary (Méhes, 1911; Kozur, 1971; Monostori, 1995),  
353 West Carpathians (Salaj and Jendrekova, 1984), Guangxi, South China (Crasquin et al., 2006),  
354 Tibet (Forel and Crasquin, 2011). They differ only by a larger radius of curvature of AB here.

355  
356 *Bairdia? sp. 2*

357 Fig. 6 t

358 **Material:** 1 carapace



385  
386  
387  
388  
389  
390  
391  
392  
393  
394  
395  
396  
397  
398  
399  
400  
401  
402  
403  
404  
405  
406  
407  
408  
409  
410

Fig. 7 a

1960 *Ptychobairdia kristanae* n. g. n. sp. - Kollmann, p. 99 - 100, pl. 25, figs. 6 - 9.

1960 *Ptychobairdia medwenitschi* n. g. n. sp. - Kollmann, p. 101 - 102, pl. 26, figs. 1 - 11.

1963 *Ptychobairdia kristanae* Kollmann - Kollmann, p. 181

**Material:** 1 carapace

**Dimensions:** L = 1180 µm; H = 763 µm

**Stratigraphic and geographic range:** Late Carnian (*Tropites dilleri* zone). Mufara Formation outcropping in the east side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E) (this work), Rhaetian - Early Jurassic of Austria (Kollmann, 1960; 1963).

**Remarks:** The types figured by Kollmann (1960, Pl. 25, figs 6 - 9) have a ventral bulge more pronounced than here but intraspecific variations are very common in bairdiids

Genus *Bairdiacypris* Bradfield, 1935

Type species *Bairdiacypris deloi* Bradfield, 1935

*Bairdiacypris* cf. *aequisymmetrica* Mette, Honigstein et Crasquin .,2014

Fig. 7 b

**Material:** 1 incomplete carapace

**Dimensions:** L = 905 µm; H = 390 µm

**Stratigraphic and geographic range:** Late Carnian (*Tropites dilleri* zone). Mufara Formation outcropping in the east side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy (this work).

**Remarks:** the specimen discovered here is quite close to *Bairdiacypris aequisymmetrica* Mette et al., 2014 from the Middle Anisian of Austria (Mette et al., 2014) by the general outline of the carapace. Unfortunately, the PB is broken here and the doubt stays.

*Bairdiacypris* cf. *mirautae* Crasquin-Soleau and Gradinaru, 1996

411 (Fig. 7 c)

412 **Material:** 1 carapace.

413 **Dimensions:** L = 730 µm; H = 350 µm.

414 **Stratigraphic and geographic range:** Late Carnian (*Tropites dilleri* zone). Mufara Fm.

415 outcropping in the east side of Monte Scalpello (37°32'56.86''N, 14°40'30.64''E) Sicily, Italy (this  
416 work).

417 **Remarks:** the specimen discovered here is quite close in general outline to *Bairdiacypris mirautae*  
418 Crasquin-Soleau and Gradinaru, 1996 from the Early Anisian of Dobrogea (Romania; Crasquin-  
419 Soleau and Gradinaru, 1996) and Ladinian of Hungary (Monostori and Tóth, 2013). Here the  
420 carapace is shorter and the PB is less tapering.

421

422 Genus *Anchistrocheles* Brady and Norman, 1889

423 **Type species** *Anchistrocheles fumata* Brady, 1890

424 ***“Anchistrocheles” gemmellaroi* n. sp.**

425 Fig. 7 d - f

426 **Etymology:** The species is named in memory of the palaeontologist Gaetano Giorgio  
427 Gemmellaro (1832-1904).

428 **Material:** Seven complete carapaces (three adults and four juveniles).

429 **Holotype:** A complete carapace (fig. 7 e), PMC. O 18 H 10/4/2017 (L = 742 µm; H =  
430 440µm).

431 **Paratypes:** Two complete carapaces (fig. 7 d: L = 690 µm; H = 420 µm and fig. 7 f: L = 800  
432 µm; H = 490) and other not figured (PMC. O 68-73 P 10/4/2017).

433 **Type locality:** East side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy

434 **Type level:** Late Carnian (*Tropites dilleri* zone) in the dark grey clays of the Mufara  
435 Formation.

436 **Diagnosis:** A species attributed to “*Anchistrocheles*”, with bairdioid carapace sub  
437 trapezoidal, with rows of spines at AB, PVB and PB, flanks parallel in dorsal view.

438 **Description:** Bairdioid carapace sub trapezoidal in lateral view, with DB, PDB and ADB  
439 straights at both valves; AB with large radius of curvature; ventral margin concave at both valves;  
440 PB short and with a small radius of curvature; AB, PVB and PB strongly compressed laterally,  
441 without reticulation and ornamented with marginal spines at both valves; LV overlaps RV all  
442 around the carapace with maximum at dorsal parts; In dorsal view, flanks parallel (like in  
443 *Orthobairdia* genus), extremities strongly compressed laterally, a small sulcus is observable in front  
444 of mid-L; surface reticulated and small tubercles are observed on the surface in ADP and DP.

445 **Remarks:** This species is attributed to the genus “*Anchistrocheles*”. It is clear that is not this  
446 genus which is a recent one and for which the specific determinations are made on soft parts. This  
447 generic attribution with “?” was used in the past, particularly for Triassic - Jurassic specimens  
448 exhibiting row of spines along AB and PB (Carnian, Late Triassic of Turkey ([Forelet et al., 2018](#));  
449 Rhaetian, Late Triassic of Austria ([Bolz, 1971](#)), Sinemurian, Early Jurassic of Germany and  
450 Switzerland ([Beher et al., 2001](#); [Beher, 2004](#)), Bathonian, Early Jurassic of France ([Sheppard, 1981](#)  
451 [PhD MS](#)). A revision of all these species and of the definition of a new genus is in preparation  
452 ([Crasquin and Forel](#), work in progress).

453 “*Anchistrocheles*” *gemmellaro* n. sp. could be compared to *Bairdia marginosulcata* Bolz,  
454 1971 from the Late Norian – Rhaetian of Austria ([Bolz, 1971](#)) which presents a biconvex carapace  
455 in dorsal view and a smaller radius of curvature at AB. The new species is very close from  
456 *Anchistrocheles? spinosa* from the Bathonian, Middle Jurassic of North-Western France with the  
457 flanks parallel and compressed extremities in dorsal view, with spines along AB and PVB and PB.  
458 This species was described and illustrated in the PhD thesis of [Sheppard \(1981\)](#). It seems that this  
459 species was never published and is considered here as invalid. “*Anchistrocheles*” *gemmellaro* n.  
460 sp. has a AB with larger radius of curvature, and dorsal parts straighter.

461

462 Genus *Nodobairdia* Kollmann, 1963.

463 Type species *Nodobairdia mammillata* Kollmann, 1963

464 *Nodobairdia mammillata* Kollmann, 1963

465 Fig.7 g

466 1963 *Nodobairdia mammillata* n. g. n. sp. - Kollmann, p. 174, pl. 7, figs. 6 - 15

467 1971 *Nodobairdia mammillata* Kollmann, 1963 - Kristan-Tollmann, p. 63, pl. 1, fig. 1

468 1971 *Triebelina (Nodobairdia) triassica* n. sp. - Bolz 1971, p. 216, pl. 16, figs. 229 – 232

469 1978 *Nodobairdia mammillata* Kollmann, 1963 - Kristan-Tollmann, p. 84, pl. 8, figs. 1 - 6

470 **Stratigraphic and geographic range:** Late Ladinian of Alps, Austria (Kollmann, 1963;

471 Kristan-Tollmann, 1971), Late Carnian of Alps, Austria (Kristan-Tollmann, 1978). *Tropites dilleri*

472 zone of the Mufara Formation outcropping in the east side of Monte Scalpello (37°32'56.86''N;

473 14°40'30.64''E) Sicily, Italy (this work); Norian – Rhaetian of Alps, Austria (Bolz, 1971).

474  
475 Family Acrafiidae Gründel, 1962

476 Genus *Acratia* Delo, 1930

477 **Type species** –*Acratia typica* Delo, 1930

478 *Acratia maugerii* n. sp.

479 Fig. 7 h - j

480 1991 *Acratia* sp. -Kristan-Tollmann, p. 196, pl.1, fig. 1

481 2013 *Acratia goemoeryi* (Kozur, 1970) - Monostori and Tóth, p. 6-7, pl. 4, only fig. 2

482 **Etymology:** The species is named in memory of Giuseppe Maugeri-Patanè palaeontologist  
483 in Catania University for his scientific engagement in Mesozoic palaeontology.

484 **Material:** Three complete carapaces.

485 **Holotype:** One complete carapace (fig. 7h, j), PMC. O 19 H 10/4/2017 (L = 1110 µm; H =  
486 490 µm).



487 **Paratypes:** Two complete carapaces, one figured PMC. O 74 P 10/4/2017 (fig. 7i: L=805  
488  $\mu\text{m}$ , H=380  $\mu\text{m}$ ).

489 **Type locality:** East side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy.

490 **Type level:** Late Carnian (*Tropites dilleri* zone), Mufara Formation.

491 **Diagnosis:** A new species of *Acratia* with short carapace (H/L = 0.45 – 0.46 for the  
492 measured specimens), quite semicircular valves, straight VB and PB a little slender for the genus;  
493 acratian beak clearly expressed.

494 **Description:** Carapace short (H/L = 0.45 – 0.46 for the measured specimens), quite  
495 semicircular in lateral view with PB more acute and slightly longer than AB. Ventral margin almost  
496 straight, anteriorly ending with a pronounced acratian beak. Caudal process acute. Left valve wider  
497 than the right. Strong overlap especially in centro-ventral and antero-dorsal margin. Outer surface  
498 smooth. Carapace biconvex in dorsal view.

499 **Stratigraphic and geographic range:** Late Ladinian of NE Iran ([Kristan-Tollmann, 1991](#))  
500 and Balaton Highland, Hungary ([Monostori and Tóth, 2013](#)) -Late Carnian (*Tropites dilleri* zone),  
501 Murfa Formation, Sicily, Italy (this work).

502 **Remarks:** the figured specimens are put in synonymy with *Acratia* sp., from the Late  
503 Ladinian from NE Iran ([Kristan-Tollmann, 1991](#)) and one specimen figured by [Monostori and Tóth](#)  
504 ([2013](#)) from Ladinian of Balaton Highland, Hungary. *Acratia triassica* [Kozur, 1970](#) (figs. 2—5  
505 only, not fig. 1) is very close from the new species. However here the carapace is more rounded in  
506 dorsal part with a PB less acuminate.

507  
508 Family Bythocyprididae Maddocks, 1969

509 Genus *Bythocypris* Brady, 1880

510 Type species *Bythocypris reniformis* Brady, 1880

511 *Bythocypris?* sp. 1

512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535

Fig. 7 k

**Material:** 1 carapace.

**Dimensions:** L = 568  $\mu\text{m}$ ; H = 300  $\mu\text{m}$ .

**Stratigraphic and geographic range:** Late Carnian (*Tropites dilleri* zone), of the Mufara Formation outcropping in the east side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy (this work).

**Remarks:** a specimen attributed with doubt (this genus is a Recent one defined on soft parts) to the genus *Bythocypris*. It is quite close to *Bythocypris* sp. B in Bolz, 1971 from the Norian - Rhaetian of Austria which has a very similar outline except here a VB more convex. We have not enough material to go further in determination.

Superfamily Cypridoidea Baird, 1845

Family Pontocyprididae Müller, 1894

Genus *Pontocypris* Sars, 1866

Type species *Cypris serrulata* Sars, 1863

***Pontocypris rara* Méhes, 1911**

Fig. 7 l

1911. *Pontocypris rara* n.sp. –[Méhes, 1911, p.13, pl. 1, fig.5](#)

**Material:** 1 carapace.

**Dimensions:** L = 662  $\mu\text{m}$ ; H = 288  $\mu\text{m}$ .

**Stratigraphic and geographic range:** Late Carnian of Balaton Highland, Hungary ([Méhes, 1911](#)) and Monte Scalpello (*Tropites dilleri* zone), (37°32'56.86''N, 14°40'30.64''E) Sicily, Italy (this work).

536 Family Judahellidae Sohn, 1968

537 Genus *Judahella* Sohn, 1968

538 Type species *Judahella tsorfatia* Sohn, 1968

539 *Judahella? montanarii* n. sp.

540 Fig. 7 m - n

541 **Etymology:** The species. is named in memory of Loris Montanari geologist in Catania

542 University. **Material:** Two complete carapaces.

543 **Holotype:** A complete carapace figured in Fig. 7m (PMC O 20 H 10/4/2017) (L = 450 µm;  
544 H = 200 µm).

545 **Paratype:** A complete carapace figured in fig. 7n (PMC O 76 P 10/4/2017).

546 **Type locality:** East side of Monte Scalpello (37°32'56.86''N; 14°40'30.64''E), Sicily, Italy.

547 **Type level:** Late Carnian (*Tropites dilleri* zone) in the dark grey clays of the Mufara  
548 Formation.

549 **Diagnosis:** *Judahella? montanarii* n. sp. is characterized by subrectangular elongate  
550 carapace with a long straight DB ended by a caudal process, presence of lateral ridges and tubercles  
551 on valve surface.

552 **Description:** Lateral view: small carapace elongate subrectangular (Fig. 7m, n); long  
553 straight DB ended by a short caudal process. Upper part of AB straight with an angle of 110° with  
554 DB; maximum of convexity of AB located below mid-H; VB slightly convex, surface of valves are  
555 ornamented by large ridges and nodes reticulated; dorsal ridges overpass hinge line; the largest and  
556 strong ridge is arched and shows variable thickness through its length; it begins in the antero-  
557 dorsal margin, moves downwards until reaching the centre of the ventral margin and back again  
558 towards the postero-dorsal margin initially curved and then straight and facing forward. Another  
559 thinner ridge is present along the outer edge of the anterior margin of the valves. Two stubby  
560 nodes are present in the posterior dorsal and in the central anterior area.

561 Dorsal view: hinge line long and straight; caudal process strongly compressed laterally;

562 ridges and nodes very prominent by absence of ventro-lateral swollen process  
563 **Remarks:** The new species is attributed to *Judahella*? The doubt comes from the presence of the  
564 posterior caudal process never described in the genus. The present specimens could be compared  
565 to *Judahella tsorfatia* Sohn, 1968 from the Ladinian of Eastern France (Sohn, 1968) by their  
566 similar subrectangular lateral outline. But here the nodes are gathered in ridges and there is a  
567 caudal process. *Judahella tuberculifera* (Gümbel, 1869) from Carnian of Italian Alps (Gümbel,  
568 1869; Lieberman, 1979), Anisian – Ladinian of Poland (Styk, 1958), Ladinian of France (Sohn,  
569 1968), Anisian of Germany (Knüpfer and Kozur, 1968), Ladinian of Spain (Kozur et al., 1974) and  
570 Anisian of South China (Kristan-Tollmann, 1983) has a general dorsal outline which can evoke the  
571 new species.

572  
573 Family Glorianellidae Snejder, 1960 emend. Kozur 1970

574 Genus *Mockella* Bunza and Kozur, 1971

575 Type species *Mockella marinae* (Kozur, 1970)

576 *Mockella muelleri* Bunza and Kozur, 1971

577 Fig. 7 o - p

578 1971 *Mockella muelleri* n. sp. - Bunza and Kozur, p. 8 - 9, pl. 1, fig. 12

579 **Material:** 2 carapaces, 1 figured.

580 **Dimensions:** L = 390 µm; H = 235 µm (figured specimen).

581 **Stratigraphic and geographic range:** Late Carnian of Tyrol, Austria (Bunza and Kozur,  
582 1971) and east side of Monte Scalpello (37°32'56.86''N, 14°40'30.64''E) Sicily, Italy (this work).

583

584

585 Fig. 7. Carnian ostracods from Monte Scalpello. Scale bar= 200µm (a – l); 100µm (m – p). Ostracodes du Carnien du

586 Monte Scalpello. Barre d'échelle 200µm (a-l), 100µm (m-p).

587

588

589 **Conclusion.**

590 Carnian Ostracods are known worldwide, from Alaska (Sohn, 1968), Alps (Kristan-  
591 Tollmann, 1969, 1978; Kollmann, 1963), Austria (Kristan-Tollmann, 1971, 1973, 1988; Bunza and  
592 Kozur, 1971), British Columbia (Arias and Lord, 2000), Germany (Gründel, 1965; Bunza and  
593 Kozur, 1971), Hungary (Kristan-Tollmann et al., 1991; Kozur 1971, 1972; Bunza and Kozur, 1971),  
594 Indonesia (Kristan-Tollmann and Hasibuan, 1990), Israel (Sohn, 1968; Gerry et al., 1988; Bunza  
595 and Kozur, 1971); Italy (Kristan-Tollmann, 1971, 1973, 1982, 1983; Liebermann, 1979), Slovenia  
596 (Kolar-Jurkovsek ,1990) and Turkey (Forel et al., 2018). The turn-over between Palaeozoic and  
597 Mesozoic ostracod fauna is long, at least 14 My, began in the early Late Permian (in the Early  
598 Wuchiapingian) and is considered to be ended in the Anisian (Crasquin and Forel, 2013). However,  
599 some Palaeozoic genera are still present in the Carnian: three Kirkbyidae (*Carinaknightina*,  
600 *Kirkbya*, *Tubulikirkbyia*?) in Turkey deep environment (Forel et al., 2018) and *Acratia*, discovered  
601 as well in Turkey (Forel et al., 2018) whose presence is confirmed here.

602 The paleoecological interpretation of the Carnian ostracods association of Monte Scalpello  
603 is not easy. It is necessary to consider both the structure, composition and taphonomic  
604 characteristics of the association found, as well as the sedimentological characteristics of the  
605 sedimentary Unit and its position in the palaeogeographic context at that time.

606 First of all the strong shelled forms and absence of typical deep water species it would seem  
607 to indicate a not deep waters association. From the taphonomic point of view, it is very interesting  
608 to note that the ostracods specimens are predominantly represented by integer carapaces and rare  
609 valves. This could suggest a rapid burial *in situ* in a high sedimentation rates environment, since the  
610 valves, after the death of the specimens, tend to open in a few hours (Guernet & Lethiers, 1989).  
611 Similar taphonomic characteristics were also found by Pokorny (1964) and Oertli (1971) for pelitic  
612 layer associations deposited in extremely rapid distal sedimentation basins.

613 Another important datum concerns the size of all the found skeletal remains. Gastropods,  
614 bivalves, crinoids and brachiopods remains are all of the same little size; also the ostracod  
615 thanatocoenosis structure is characterized by abundance of juveniles and rare adults; according to  
616 van Harten (1986), all that would suggest strong phenomena of dimensional selection and,  
617 therefore, displaced of faunas and sediments ().

618 From the sedimentological point of view the study area is characterized by the extreme  
619 abundance of pelitic sediments with interbedded sandy levels sometimes rich in oolites. Sometimes  
620 this sediments shown in the outcrop, particular sedimentary structures as parallel lamination, wavy  
621 lamination and vortices structures, all features that make one think of a high-energy sedimentation  
622 environment.

623 From a palaeogeographic point of view, the Mufara Formation outcropping in the studied  
624 area, is located inside the pelagic Imerese Basin that is delimited by the carbonate platforms of  
625 Complesso Panormide to the west and the Complesso Trapanese to the east and to the south (Fig. 3)  
626 (Catalano and D'Argenio, 1982; Montanari, 1987; Speranza and Minelli, 2014). All the materials  
627 produced by the erosion of the carbonate platforms were conveyed in this basin (Carillat and  
628 Martini, 2009).

629 On the basis of all these data it is possible to hypothesize for the ostracods association an  
630 environment characterized by high sedimentation rates and high depositional energy, features that  
631 controls strongly, today as in the past, the colonization of the bottom as well as the composition and  
632 structure of the populations (cf. Di Geronimo & Robba, 1989; Sciuto, 2014). According to Carillat  
633 and Martini (2009), the Monte Scalpello area, it could be a probably, distal turbiditic sedimentary  
634 environment not necessarily very deep (Fig. 8). The collection of further faunistic and  
635 sedimentological data (whose finding and observation is made extremely difficult by the intense  
636 agricultural activity) can lead to more detailed information on the Triassic palaeo-environment of  
637 the Monte Scalpello area.

638

639

640 Fig. 8. Schematic palaeoenvironmental model for the Late Carnian Mufara Formation (see also Fig. 3). Modèle  
641 paléoenvironnemental schématique de la Formation Mufara du Carnien supérieur (voir également fig. 3)

642

643 Declaration of interest.

644 The authors declare that they do not have any links of interest.

645

646 Acknowledgements

647 The authors are grateful to the reviewers and the editors for detailed suggestions and  
648 comments to the manuscript. Thanks are due also to Mr. Alfio Viola (Electronic Microscopy  
649 Laboratory, University of Catania) for SEM photos assistance. Catania Palaeoecological Research  
650 Group contribution n° xxx.

651

652

653

654

## REFERENCES

655

656 [Anderson, F.W., 1964. Rhaetic ostracoda. Bulletin of the Geological Survey of Great Britain 21,](#)  
657 [133-174.](#)

658 [Arias, C., Lord, A., 2000. Upper Trias marine ostracoda from the Queen Charlotte Islands British](#)  
659 [Columbia Canada. Revista Española de Micropaleontologia 32, 175-192.](#)

660 [Beher, E., 2004. Ostracodenfauna und Biostratigraphie im Ober-Sinemurium von Süddeutschland](#)  
661 [und der Nordschweiz. Stuttgarter Beiträge zur Naturkunde Serie B \(Geologie und](#)  
662 [Paläontologie\) 349, 1–170.](#)

663 Beher, E., Franz, M., Schweizer, V., 2001. Zur Ostracodenfauna des Ober-Sinemurium und  
664 untersten Unter-Pliensbachium im Gebiet von Tuningen (Baden-Württemberg). Neues  
665 Jahrbuch für Geologie und Paläontologie, Abhandlungen 219, 329–391.

666 Bolz, H., 1971. Die Zlambach-Schichten (alpine Obertrias) unter besonderer Berücksichtigung der  
667 Ostrakoden, 1: Ostrakoden der Zlambach-Schichten, besonders Bairdiidae. Senckenbergiana  
668 Lethaea 52, 129–283.

669 Brady, G. S., 1880. Report on the Ostracoda dredged by H.M.S. Challenger during the Years 1873-  
670 1876. In: Report on the scientific results of the voyage of H.M.S. Challenger. Zoology 1, 1-  
671 184.

672 Brady, G. S., 1890. On Ostracoda collected by H.B. Brady, Esq., L.L.D., F.R.S. in the South Sea  
673 Islands. Transactions of the Royal Society of Edinburgh: Earth Sciences 35, 489-525.

674 Brady, G. S., Norman, A. M., 1889. A Monograph of the Marine and Freshwater Ostracoda of the  
675 North Atlantic and of North Western Europe. Sect I. Podocopa. Scientific Transactions of  
676 the Royal Dublin Society 2, 63-270.

677 Bradfield, H. H., 1935. Pennsylvanian ostracods of the Ardmore Basin, Oklahoma. Bulletin of  
678 American Paleontology 22, 1-145.

679 Bunza, G., Kozur, H., 1971. Beiträge zur Ostracodenfauna der tethyalen Trias. Geologisch-  
680 Paläontologische Mitteilungen Innsbruck 1, 1–76.

681 Calcara P., 1840. Monografie dei generi *Clausilia* e *Bulimo*, coll'aggiunta di alcune nuove specie di  
682 conchiglie siciliane esistenti nella collezione della Sig. Teresa Gargotta in Salinas, 54 p.

683 Calcara, P., 1845. Cenno sui molluschi viventi e fossili della Sicilia da servire di supplement ed  
684 insieme di critiche osservazioni all'opera di R. A. Philippi.. Reale stamperia e Libreria  
685 Palermo 65 p



686 Carrillat, A., Martini, R., 2009. Palaeoenvironmental reconstruction of the Mufara Formation  
687 (Upper Triassic, Sicily): High resolution sedimentology, biostratigraphy and sea-level  
688 changes Palaeogeography, Palaeoclimatology, Palaeoecology 283, 60-76.

689 Catalano, R., D'Argenio, B., 1982. Schema geologico della Sicilia occidentale. In R. Catalano and  
690 B. D'Argenio (eds.) Guida alla geologia della Sicilia occidentale. Guide geologiche  
691 regionali, Memorie Società Geologica Italiana suppl. A 24, 9-41.

692 Crasquin, S., Forel, M.B., 2013. Ostracods (Crustacea) through Permian - Triassic events. Earth-  
693 Science reviews 137, 52-64

694 Crasquin, S., Forel, M.-B., Feng, Q., Yuan, A., Baudin, F., Collin, P. Y., 2010. Ostracods  
695 (Crustacea) through Permian-Triassic boundary in South China: the Meishan stratotype  
696 (Zhejiang Province). Journal of Systematic Palaeontology 8, 331-370.

697 Crasquin-Soleau, S., Galfetti, T., Bucher, H., 2006. Early Triassic ostracods from South China.  
698 Rivista Italiana di Paleontologia e Stratigrafia 112 (1), 55-75.

699 Crasquin-Soleau, S., Gradinaru, E., 1996. Early Anisian ostracode fauna from the Tulcea unit  
700 (Cimmerian North Dobrogean orogeny, Romania). Annales de Paléontologie 82, 59–116.

701 Dal Sasso, C., Insacco, G., Chiarenza, A. A., Di Franco, D., Reitano, A., 2014. First record of  
702 *ichthyosaurus* in Sicily (Upper Triassic of Monte Scalpello, Catania province). Rivista  
703 Italiana di Stratigrafia e Paleontologia 120 (1), 71-82.

704 Delo, D.M., 1930. Some Upper Carboniferous ostracods from the Shale Basin of Western Texas.  
705 Journal of Paleontology 4, 152–178.

706 Di Geronimo, I., Robba, E., 1989, The structure of benthic communities in relation to basin  
707 stability. Memorie dell' Accademia dei Lincei 80, 341-352.

708 Di Paolo, L., Aldega, L., Corrado, S., Mastalerz, M., 2012. Maximum burial and unroofing of Mt.  
709 Judica recess area in Sicily: implication for the Apenninic–Maghrebian wedge dynamics.  
710 Tectonophysics 530–531, 193–207.

- 711 Drexler, E., 1958. Foraminiferen und Ostracoden aus dem Lias von Siebeldingen/Pfalz.  
712 Geologisches Jahrbuch 75, 475–554.
- 713 Egorov, V. G., 1950. Ostrakody franskogo iarusu Russkoi platformy, 1. Kloedenellidae: Moscow-  
714 Leningrad Vses. Neft. Nauchno-Issled. Geol. Razved. Inst., Moscov, Filial, 140 p.
- 715 [Forel, M. B., Crasquin, S., 2011. In the aftermath of the Permian-Triassic boundary mass  
716 extinction: ostracod new species and genus from South Tibet. \*Geodiversitas\* 33, 247–263.](#)
- 717 [Forel, M.B., Tekin, U.K., Okuyucu, C., Bedi, Y., Tuncer, A., Crasquin, S., 2018. Discovery of a  
718 long-term refuge for ostracods \(Crustacea\) after the end-Permian extinction: a unique  
719 Carnian \(Late Triassic\) fauna from the Mersin Melange, southern Turkey. \*Journal of  
720 Systematic Palaeontology\* 16 \(3\).](#)
- 721 [Gemmellaro, G. G., 1860. Ceno sopra taluni organici fossili del Turoniano e Nummulitico di  
722 Judica. \*Atti Accademia Gioenia di Scienze Naturali in Catania\* 2 \(15\), 268-284.](#)
- 723 [Gemmellaro, G. G., 1904. I Cefalopodi del Trias Superiore della regione occidentale della Sicilia.  
724 \*Giornale di Scienze Naturali ed Economiche di Palermo\* 24, 319 p.](#)
- 725 Gerry, E., Honigstein, A., Rosenfeld, A., Hirsch, F., Eshet, Y., 1988. The Carnian salinity crisis:  
726 ostracods and palynomorphs as indicators of palaeoenvironment. In R. Whatley & C.  
727 Maybury (eds.) *Ostracoda and global events*. Chapman & Hall, London, 87–99.
- 728 [Golonka, J., 2007. Late Triassic and Early Jurassic palaeogeography of the world. \*Palaeogeography,  
729 Palaeoclimatology, Palaeoecology\* 244, 297–307.](#)
- 730 [Grasso, M., 2001. The apenninic- Maghrebian orogen in southern Italy, Sicily and adjacent areas. In  
731 Vai , G. B., Martini, I. P. \(eds.\) \*Anatomy of an Orogen: The Apennines and Adjacent  
732 Mediterranean Basins\* . Kluver Acad. Publ. GB, 255-286](#)
- 733 Gründel, J. ,1962. Zur Taxionomie der Ostracoden der *Gattendorfia* Stufe Thüringens. *Freiderger  
734 Forschungshilfe* C 151, 51-105.

- 735 Gründel, J., 1964. Zur Gattung *Healdia* (Ostracoda) und zu einigen verwandten Formen aus dem  
736 unter Jura. *Geologie* 13, 1- 469
- 737 Gründel, J., 1965. Zwei neue Ostracoden-Arten aus dem unteren Keuper Thueringens.  
738 *Palaeontologische Zeitschrift* 39, 234-239.
- 739 Gründel, J., 1967. Zur Grossgliederung der Ordnung Podocopida G. W. Müller, 1894. Neues  
740 *Jahrbuch für Geologie and Palaontologie, Monatshefte* 6, 321-332
- 741 Guernet, C. & Lethiers, F., 1989, Ostracodes et recherche des milieux anciens: possibilités et  
742 limites: *Bulletin de la Société Géologique de France* 8 (5), 577-588.
- 743 Gümbel, C.W., 1869. Über Foraminiferen, Ostracoden und mikroskopische Tier-Uberreste in den  
744 St. Cassianer und Raibler Schichten. *Jahrbuch Geologischen Reichsanstalt* 19, 175–186.
- 745 Harlton, B. H., 1933. Micropaleontology of the Pennsylvanian Johns Valley Shale of Ouachita  
746 Mountains, Oklahoma and its relationships to the Mississippian Caney Shale. *Journal of*  
747 *Paleontology* 7, 3–29.
- 748 Harten, D. van, 1986. Use of ostracodes to recognize dowslope contamination in  
749 paleobathymetry and a preliminary reappraisal of the paleodepth of Prasas Marls  
750 (Pliocene), Crete, Greece. *Geology* 14, 856-859.
- 751 Jenks, J. F., Monnet, C., Balini, M., Brayard, A., Meier, M., 2015. Biostratigraphy of Triassic  
752 Ammonoids. In Klug, C. et al. (eds.), *Ammonoid Paleobiology: From macroevolution to*  
753 *paleogeography*, *Topics in Geobiology* 44, 329-388.
- 754 Knupfer, J., Kozur, H., 1968. Eine neue Ostracodengattung aus der Trias des germanischen  
755 Binnenbeckens. *Monatsberichte der Deutschen Akademie der Wissenschaften Berlin* 10,  
756 322–331.
- 757 Kolar-Jurkovsek, T., 1990. Microfauna of Middle and Upper Triassic in Slovenia and its  
758 biostratigraphic significance. *Geologija* 33, 21–170.
- 759 Kollmann, K., 1960. Ostracoden aus der alpinen Trias Österreichs. I *Parabairdia* n. g. und  
760 *Ptychobairdia* n. g. (Bairdiidae). *Jahrbuch der Geologischen Bundesanstalt* 5, 79–105.

- 761 Kollmann, K., 1963. Ostracoden aus der alpinen Trias. II.- Weitere Bairdiidae. Jahrbuch der  
762 Geologischen Bundesanstalt Wien 106, 121-203.
- 763 Kozur, H., 1970. Neue Ostracoden-Arten aus dem Obersten Anis des Bakonyhochlandes (Ungarn).  
764 Berichte des naturwissenschaftlich-medizinischen Vereins in Innsbruck 58, 384-428.
- 765 Kozur, H. 1971. Die Bairdiacea der Trias. Teil 3: Einige neue Arten triassischer Bairdiacea und  
766 Bemerkungen zur Herkunft der Macrocyprididae (Cypridacea). Geologisch  
767 Paläontologische Mitteilungen Innsbruck 1, 1–18.
- 768 Kozur, H. 1972. Die Bedeutung triassischer Ostracoden für stratigraphische und paläoökologische  
769 Untersuchungen. Mitteilungen der Gesellschaft für Geologie und Bergbaustudien 21, 623–  
770 660.
- 771 Kozur, H., Kampschuur, W., Mulder-Blanken, C. W. H., Simon, O. J., 1974. Contribution to the  
772 Triassic ostracode faunas of the Betic Zone (southern Spain). Scripta Geologica 23, 1-57.
- 773 Kristan-Tollmann, E., 1969. Zur stratigraphischen Reichweite der Ptychobairdien und  
774 Anisobairdien (Ostracoda) in der alpinen Trias. — Geologica et Palaeontologica 3, 81—95.
- 775 Kristan-Tollmann, E., 1970. Einige neue Bairdien (Ostracoda) aus der alpinen Trias. Neues  
776 Jahrbuch für Geologie und Paläontologie 135, 268-310.
- 777 Kristan-Tollmann, E. 1971. Weitere Beobachtungen an skulptierten Bairdiidae (Ostracoda) der  
778 alpinen Trias. Neues Jahrbuch für Geologie und Paläontologie 139, 57-87.
- 779 Kristan-Tollmann, E., 1973. Zur phylogenetischen und stratigraphischen Stellung der triadischen  
780 Healdiiden (Ostracoda) II. Erdoel-Erdgas-Zeitschrift 89, 150-155.
- 781 Kristan-Tollmann, E., 1978. Bairdiidae (Ostracoda) aus den obertriadischen Cassianer Schichten  
782 der Ruones-Wiesen bei Corvara in Südtirol. Schriftenreihe der Erdwissenschaftlichen  
783 Kommissionen, Österreichische Akademie der Wissenschaften 4, 77–104.
- 784 Kristan-Tollmann, E., 1982. Bemerkungen zur triadischen Ostracoden-Gattung *Mostlerella*. Neues  
785 Jahrbuch für Geologie und Paläontologie 9, 560–572.

- 786 [Kristan-Tollmann, E., 1983. Ostracoden aus dem Oberanin von Leidapo bei Guiyang in Süd China.](#)  
787 [Neue Beiträge zur Biostratigraphie der Tethys-Trias, 121–176.](#)
- 788 Kristan-Tollmann, E., 1988. Coccolithen aus den Älteren Allgäuschichten (Alpiner Lias, Sinemur)  
789 von Timor, Indonesien. *Geologische und Paläontologische Mitteilungen Innsbruck* 15, 71-83.
- 790 [Kristan-Tollmann, E., 1991. Ostracods from the Middle Triassic Sina Formation \(Aghdarband](#)  
791 [Group\) in NE-Iran. \*Abhandlungen der Geologischen Bundesanstalt\* 38, 195–200.](#)
- 792 [Kristan-Tollmann, E., Tollmann, A., Hamedani, A., 1979. Beiträge zur Kenntnis der Trias von](#)  
793 [Persien. I. Revision der Triasgliederung, Rhäfazies im Raum von Isfahan und Kössener](#)  
794 [Fazieseinschlag bei Waliabad SE Abadeh. \*Mitteilungen der Gesellschaft der Geologie und\*](#)  
795 [Bergbaustudenten in Österreich](#) 70, 119-186.
- 796 Kristan-Tollmann, E., Hasibuan, F. 1990. Ostracoden aus der Obertrias von Misol (Indonesien).  
797 *Mitteilungen der Österreichischen Geologischen Gesellschaft*, 82, 173–181.
- 798 Latreille, P.A., 1806. *Genera crustaceorum et insectorum secundum ordinem naturalem in familias*  
799 *disposita, iconibus exemplisque plurimis explicata. Parisiis et Argentorati*, 303 p.
- 800 [Lentini, F., 1974. Caratteri stratigrafici e strutturali della zona di Monte Judica \(Sicilia Orientale\).](#)  
801 [\*Rivista Mineraria Siciliana\* 145–147, 71–96.](#)
- 802 Lentini, F., Grasso, M., Carbone, S., 1987. *Introduzione alla geologia della Sicilia e guida*  
803 *all'escursione*. 60 pp. Catania.
- 804 [Lieberman, H. M., 1979. Die Bivalven- und Ostracodenfauna von Raibl und ihr stratigraphischer.](#)  
805 [\*Verhandlungen der Geologischen Bundesanstalt\* 2, 85–131.](#)
- 806 Lucas, S. G., 2010. The Triassic timescale: an introduction. In LUCAS, S. G. (ed.) *The Triassic*  
807 *Timescale*. Geological Society, London, Special Publications 334: 1–16.
- 808 Maddocks, R.F., 1969. Revision of Recent Bairdiidae. *Bulletin of the United States National*  
809 *Museum* 295, 1-126.

- 810 [Marinelli, O. 1899. Osservazioni geologiche sopra i terreni secondari del gruppo del M. Judica in](#)  
811 [Sicilia. Atti della Reale Accademia Nazionale dei Lincei, Rendiconti della Classe di Scienze](#)  
812 [Fisiche, Matematiche e Naturali 5, 8 \(1\), 404-412.](#)
- 813 [Maugeri Patanè, G., 1934. Sopra alcuni coralli del Trias superiore di M. Scalpello \(Enna\)](#)  
814 [Relationes Consessuum Societatis Gioieniae Catinensis Naturalium Scientiarum 67, 9 p.](#)
- 815 [McCoy, F., 1844. A synopsis of the characters of the Carboniferous Limestone fossils of Ireland.](#)  
816 [Dublin University Press, Dublin, 207 pp.](#)
- 817 [Méhes, G., 1911. Über Trias-Ostrakoden aus dem Bakony. Resultate der Wissenschaftlichen.](#)  
818 [Erforschung des Balatonsees, 1-38.](#)
- 819 [Mette, W., Mohtat-Aghai, P., 1999. Ostracods and foraminifera from Upper Triassic intrashelf](#)  
820 [basin deposits in the Northern Calcareous Alps. Geologisch Paläontologische Mitteilungen](#)  
821 [Innsbruck 24, 45–77.](#)
- 822 [Mette, W., Honigstein, A., Crasquin, S., 2014. Deep-water ostracods from the Middle Anisian](#)  
823 [\(Reifling Formation\) of the Northern Calcareous Alps \(Austria\). Journal of](#)  
824 [Micropalaeontology 34, 71–91.](#)
- 825 [Michelsen, O., 1975. Lower Jurassic biostratigraphy and ostracods of the Danish Embayment.](#)  
826 [Danmarks Geologiske Undersogelse, Raekke 2 104, 1–287.](#)
- 827 [Monostori, M., 1995. Environmental significance of the Anisian Ostracoda fauna from the Forras](#)  
828 [Hill near Felsoors \(Balaton Highland, Transdanubia, Hungary\). Acta Geologica Hungarica](#)  
829 [39, 37-56.](#)
- 830 [Monostori, M., Tóth, E., 2013. Ladinian \(Middle Triassic\) silicified ostracod faunas from the](#)  
831 [Balaton Highland \(Hungary\). Rivista Italiana di Paleontologia e Stratigrafia 119, 303–323.](#)
- 832 [Montanari, L., 1987. Lineamenti stratigrafico - paleogeografici della Sicilia durante il Ciclo Alpino.](#)  
833 [Memorie della Società Geologica Italiana 38, 361-406.](#)

- 834 [Moore, R. C., 1961. Treatise of Invertebrate Paleontology. Part Q. Arthropoda 3, Crustacea,](#)  
835 [Ostracoda: Geological Society of America and University of Kansas Press, 442p.](#)
- 836 Muller, G. W. 1894. Die Ostracoden des Golfes von Neapel und der angrenzenden Meeres  
837 Abschnilte. Fauna und Flora des golfes von Neapel 21, 1–404.
- 838 [Nelli, B., 1899a. Il Raibliano del Monte Judica nella provincia di Catania, Atti della Reale](#)  
839 [Accademia Nazionale dei Lincei, Rendiconti della Classe di Scienze fisiche, matematiche e](#)  
840 [naturali 5, 8\(1\), 91 – 92](#)
- 841 [Nelli, B., 1899b. Il Raibl nei dintorni di M. Judica. Bollettino della Società Geologica Italiana 18](#)  
842 [\(2\), 211-223.](#)
- 843 Oertli, H. J., 1971. The aspect of ostracode faunas - a possible new tool in petyroleum  
844 sedimentology: Bulletin du Centre de Recherches de Pau 5, suppl.: 137-151.
- 845 Özdikmen, H., 2010. Substitute names for three genera of Ostracoda (Crustacea). Munis  
846 Entomology and Zoology, Scientific note 5, 315
- 847 Pokorny, V., 1964. Some paleoecological problems in marine ostracode faunas, demonstrated  
848 on the Upper Cretaceous ostracodes of Bohemia, Czechoslovakia: Pubblicazioni della  
849 Stazione Zoologica di Napoli 33 Suppl.: 462-479.
- 850 [Preto, N., Kustatscher, E., Wignall, P. B., 2010. Triassic climates. State of the art and perspectives.](#)  
851 [Palaeogeography, Palaeoclimatology, Palaeoecology 290, 1–10.](#)
- 852 Reuss, A. E., 1869. Zur fossilen Fauna der Oligocänschichten von Gaas. Sitzungsberichte der  
853 österreichischen Akademie der Wissenschaften, mathematisch-naturwissenschaftliche  
854 Klasse Abt.1. 59 (3), 446-488.
- 855 Roundy, P. V., 1926. Mississippian formations of the Saba County, New York and its fauna. United  
856 States Geological Survey, Professional Paper 146, 5–8.
- 857 [Salag, J., Jendrejakova, O., 1984. Ecology and facial relation of some groups of Triassic](#)  
858 [foraminifers and ostracods of stratigraphic importance. Geologický Zborník – Geologica](#)  
859 [Carpathica 35\(2\), 231-240.](#)

- 860 Sandberg, F., 1866. Die Stellung der Raibler Schichten in dem frankisichen und schwabischen  
861 Keuper. *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie*, 41.
- 862 Sars, M., 1863. Bemaerkninger over fire norske Hydroider. *Forhandlinger i Videnskabs-selskabet i*  
863 *Christiania* 1862, 25-39.
- 864 Sars, G. O., 1866. Oversight af Norges marine Ostracoder. *Forhandlinger i Videnskabs-Selskabet i*  
865 *Christiania*, 1865, 1-130.
- 866 Scalia, S., 1907. I fossili del Trias superiore dell'Acquanova e di Paraspora. *Bollettino dell'*  
867 *Accademia Gioenia di Scienze Naturali in Catania* 2 (1-2), 10-12.
- 868 Scalia, S., 1907. La fauna del Trias superiore del gruppo montuoso di Judica. *Bollettino dell'*  
869 *Accademia Gioenia di Scienze Naturali in Catania* 2 (3-4), 17-25.
- 870 Scalia, S., 1909. Il gruppo di M. Judica. *Bollettino della Società Geologica Italiana* 28, 269-340.
- 871 Scalia, S., 1910-1914. La fauna del Trias superiore del gruppo del M. Judica: Parti 1-3. *Atti*  
872 *dell'Accademia Gioenia di Scienze Naturali in Catania* 5 (3-5-7), p. 51+58+25.
- 873 Schmidt di Friedberg, P., Trovò, A., 1962. Contribution à l'étude structurale du groupe du Monte  
874 Judica (Sicile orientale). *Bulletin de la Société Géologique de France* 4(5), 754-759.
- 875 Sciuto, F., 2014. Initial report on ostracod fauna from the Messina Straits (Ionian Sea, northeastern  
876 Sicily). *Bollettino della Società Paleontologica Italiana* 53 (2), 121-134.
- 877 Sebe, O., Crasquin, S., Gradinaru, E., 2013. Early and Middle Anisian (Triassic) deep-water  
878 ostracods (Crustacea) from North Dobrogea (Romania). *Revue de Paléobiologie* 32, 509-  
879 529.
- 880 Sheppard, L. S., 1981. Middle Jurassic Ostracoda from Southern England and Northern France.  
881 Unpublished PhD thesis, University of London: 358 pp.
- 882 Schornikov, E. I., Michailova E. D., 1990. Ostracods Bythocytheridae at early stage of  
883 development. Comparative morphology, paleoecology and evolutionary pathways. *Nauka*,  
884 Moskva, 1-280 p.
- 885 Snejder, G. F., 1960. Fauna ostracod nizne triasovych otlozenij Prikaspijskoj nizmennosti. *Trudy*  
886 *Kiuge* 5, 287-303.
- 887 Sohn, I. G., 1968. Triassic Ostracodes from Makhtesh Ramon, Israel. *Bulletin of the Geological*  
888 *Survey of Israel* 44, 1-71.



- 889 Speranza, F., Minelli, L., 2014. Ultrathick Triassic dolomites control the rupture behavior of the  
890 central Apennine seismicity: Evidence from magnetic modeling of the L'Aquila fault zone.  
891 *Journal of Geophysical Research: Solid Earth* 119, 1-15. ,
- 892 Sylvester-Bradley, P. C., 1961. Suborder Metacopina Sylvester-Bradley, n. suborder. Q358–359. In  
893 Moore, R. C. (ed.). *Treatise of invertebrate paleontology. Part Q, Arthropoda 3, Crustacea,*  
894 *Ostracoda.* Geological Society of America, Boulder, CO and University of Kansas Press,  
895 Lawrence, KS, 442 pp.
- 896 Styk, O., 1958. Triassic microfauna in the neighbourhood of Chrzanow and the northwestern part of  
897 the Mesozoic periphery of the Swiety Kryzycz Mts. *Bulletin Poland Instytut Geologiczny*  
898 121, *Micropalaeontological researches in Poland* 3, 163-176.
- 899 Széles, M., 1965. Ostracodák a Bakonyi Nosztori-Volgy felsokarni rétegeiből. *Földtani közlöny*45,  
900 412-417.
- 901 Tollmann, A., 1976. *Analyse des klasschen nordalpinen Mesozoikums. Monographie des*  
902 *Nördlichen Kalkalpen* 2, 1-580.
- 903 Ulrichs, M., 1970. Variability of some Ostracods from the Cassian beds (Alpine Triassic)  
904 depending on the ecology. *Bulletin du Centre Recherches de Pau – SNPA* 5, 695-715.

905

906

907

908 Captions. Légendes

909 Fig. 1. Geographical location of the sampling area. Localisation géographique de la zone  
910 d'étude.

911

912 Fig. 2. Structural scheme of the central Mediterranean area with the location of the study area  
913 (after Grasso, 2001 modified). Schéma structural de la Méditerranée centrale avec la  
914 localisation de la zone d'étude (d'après Grasso, 2001 modifié)

915

916 Fig. 3. Schematic palaeogeographic reconstruction of Pangaea and Neo-Tethys in Late  
917 Triassic times (after Speranza & Minelli (2014), Golonka, 2007 and Preto et al., 2010

918 modified). Reconstruction paléogéographique schématique de la Pangée et de la  
919 Néo-Téthys à la fin du Trias (d'après Speranza & Minelli, 2014; Golonka, 2007 et  
920 Preto et al., 2010 modifié).

921

922 Fig. 4. Geological map of the Monte Scalpello area (after Lentini, 1974 and Di Paolo et al.  
923 2012, modified). Carte géologique de la région de Monte Scalpello (d'après Lentini,  
924 1974 et Di Paolo et al. 2012, modifié)

925

926 Fig. 5. Carnian Ammonoid zones (after Lucas 2010 modified). Zones à ammonoidés du  
927 Carnien (d'après Lucas 2010, modifié).

928

929 Figure 6. Carnian ostracods from Monte Scalpello. Scale bar 200µm. Ostracodes du Carnien  
930 du Monte Scalpello. Barre d'échelle 200µm.

931 a - b. *Ogmoconchella felsooersensis* (Kozur, 1970). **a.** Complete carapace, right external lateral  
932 view; **b.** Complete carapace, dorsal view.

933 c - d. *Healdia* sp. **c.** Complete carapace, right external lateral view; **d.** Complete carapace, dorsal  
934 view.

935 **e.** *Bektasia* sp. 1. Complete carapace, left external lateral view.

936 f - h. *Hiatobairdia subsymmetrica* Kristan-Tollmann, 1970. **f.** Complete carapace, right external  
937 lateral view; **g.** Complete carapace, right external lateral view; **h.** Complete carapace,  
938 dorsal view.

939 i - j. *Bairdia* cf. *humilis* Monostori, 1995. **i.** Complete carapace, right external lateral view; **j.**  
940 Complete carapace, dorsal view.

941 k - l. *Bairdia* cf. *deformata* Kollmann, 1963. **k.** Complete carapace, right external lateral view; **l.**  
942 Complete carapace, dorsal view.

943 m. *Bairdia cassiana* (Reuss, 1869), complete carapace, right external lateral view.

944 n, o. *Bairdia* sp. 1. Complete carapace, right external lateral view.

945 p. *Bairdia balatonica* Méhes, 1911. Complete carapace, right external lateral view.

- 946 q - r. *Bairdia scaliai* n. sp. **q**. Paratype, complete carapace, left external lateral view; **r**. Holotype,  
947 complete carapace, right external lateral view.
- 948 s. *Bairdia* cf. *finalyi* (Méhes, 1911). Complete carapace, right external lateral view.
- 949 t. *Bairdia?* sp. 2. Complete carapace, right external lateral view.
- 950 u. *Bairdia* sp. 3. Complete carapace, right external lateral view.
- 951
- 952 Fig. 7. Carnian ostracods from Monte Scalpello. Scale bar = 200µm (a – l); 100 µm (m – p).  
953 Ostracodes du Carnien du Monte Scalpello. Barre d'échelle 200 µm (a - l), 100 µm  
954 (m - p).
- 955 a. *Ptychobairdia kristinae* Kollmann, 1960. Complete carapace, right external lateral view.
- 956 b. *Bairdiacypris* cf. *aequisymmetrica* Mette et al.,2014. Complete carapace, right external lateral  
957 view .
- 958 c. *Bairdiacypris* cf *mirautae* Crasquin-Soleau and Gradinaru, 1996. Complete carapace, right  
959 external lateral view.
- 960 d - f. "*Anchistrocheles*" *gemmellaro*i sp. nov. **d**. Paratype, complete carapace, left external lateral  
961 view ,
- 962 **e**. "*Anchistrocheles*" *gemmellaro*i sp. nov. Holotype, complete carapace, right external lateral view.  
963 **f**. Paratype, complete carapace, dorsal view.
- 964 g. *Nodobairdia mammillata* Kollmann, 1963. Complete carapace, right external lateral view.
- 965 h - j. *Acratia maugerii* n. sp. **h**. Holotype, complete carapace, right external lateral view; **i**. Paratype,  
966 complete carapace, left external lateral view; **j**. Paratype, complete carapace, dorsal view.
- 967 k. *Bythocypris?* sp. 1. Complete carapace, right external lateral view.
- 968 l. *Pontocypris rara* Méhes, 1911. Complete carapace, left external lateral view.
- 969 m - n. *Judahella?* *montanarii* n. sp. **m**. Holotype, left valve, external lateral view; **n**. Paratype,  
970 complete carapace, dorsal view.

971 o - p. *Mocklella muelleri* Bunza and Kozur, 1971. **o**. Complete carapace, left external lateral view;  
972 p. Complete carapace, dorsal view.

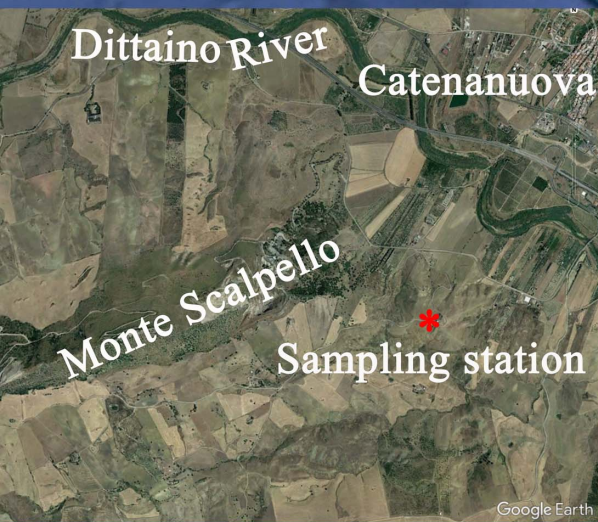
973

974 Fig. 8. Schematic palaeoenvironmental model for the Late Carnian Mufara Formation basin  
975 (see also Fig. 3). Modèle paléoenvironnemental schématique de la Formation Mufara du Carnien  
976 supérieur (voir également fig. 3)

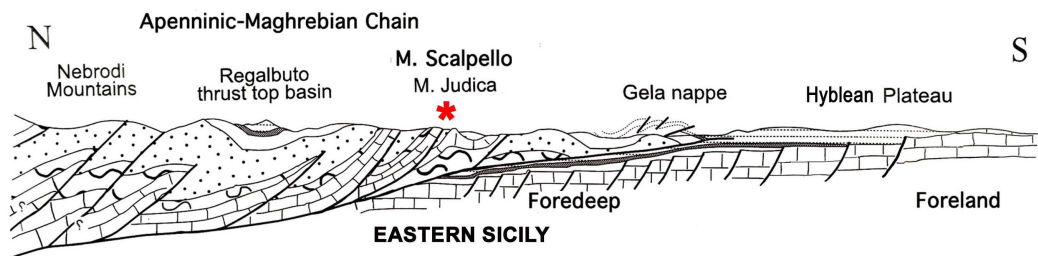
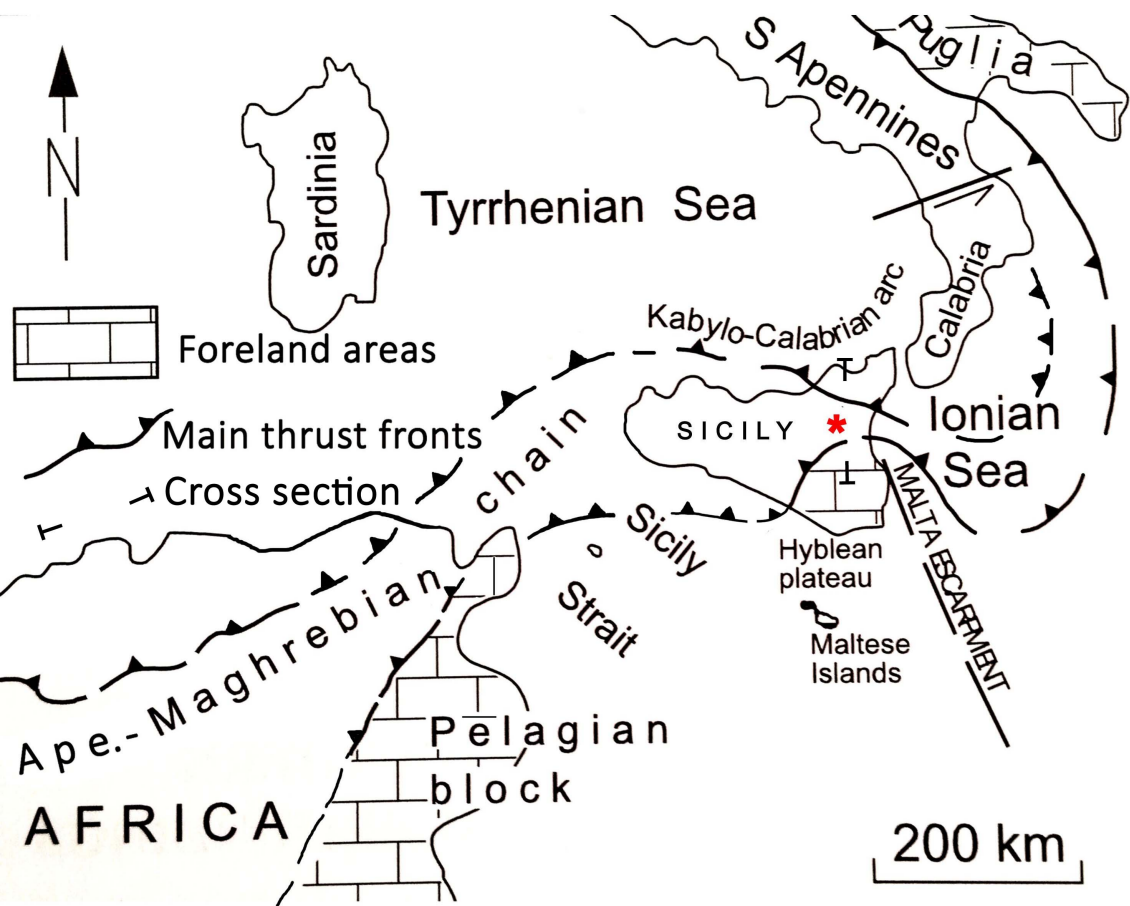
977

978

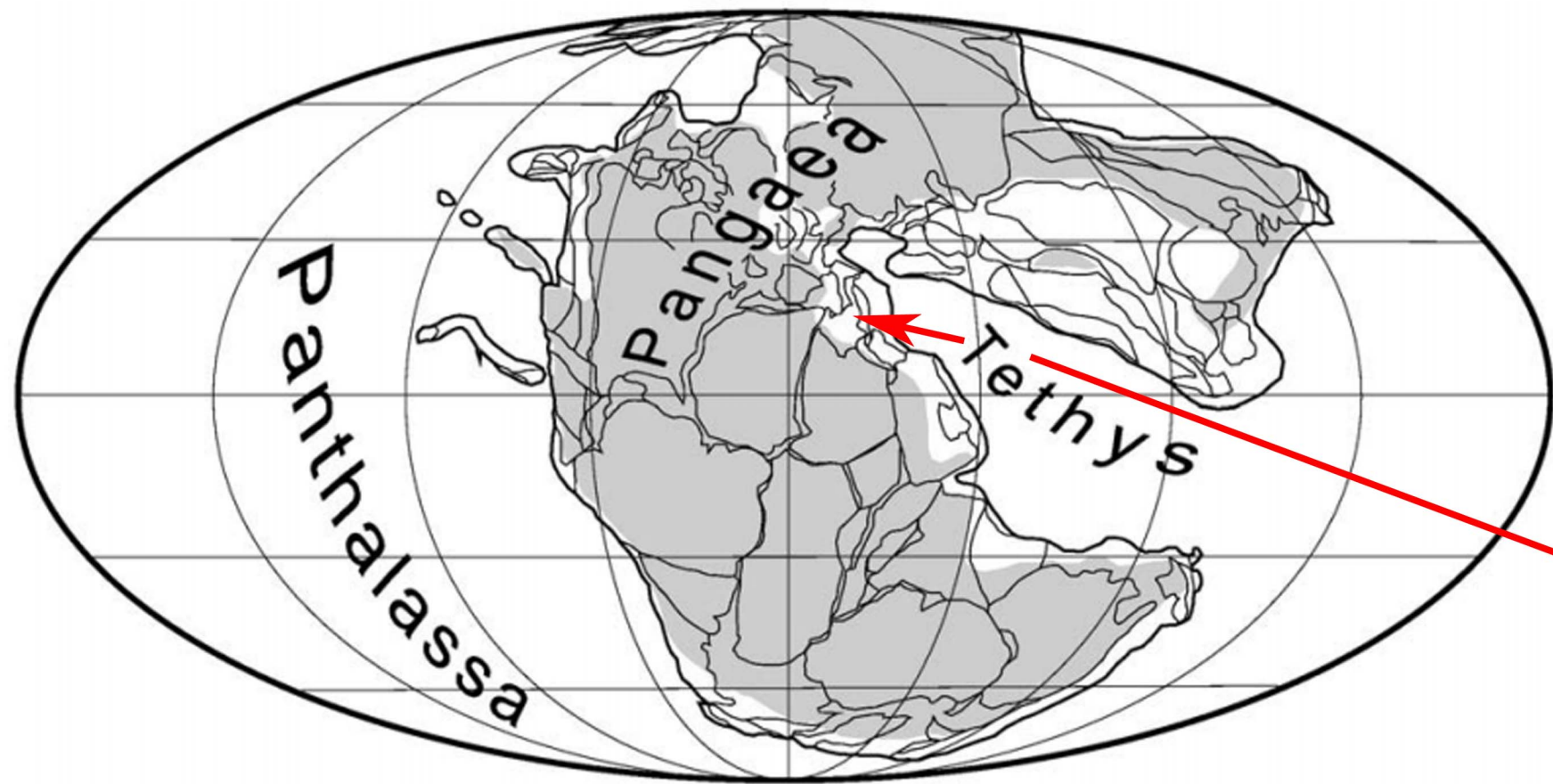








- |  |                                      |  |                         |
|--|--------------------------------------|--|-------------------------|
|  | Oligocene-lower Miocene flysch       |  | Pliocene-Quaternary     |
|  | Cretaceous - Eocene variegated clays |  | Messinian evaporites    |
|  | Upper Triassic-Jurassic carbonates   |  | Miocene clays and marls |



Late Triassic paleogeography

