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PART R, REVISED, VOLUME 1, CHAPTER 8T2: SYSTEMATIC DESCRIPTIONS: SUPERFAMILY CARPILIOIDEA

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Superfamily CARPILIOIDEA Ortmann, 1893

[*nom. transl.* KARASAWA & SCHWEITZER, 2006, p. 42, *pro* CARPILINAE
ORTMANN, 1893, p. 429]

Carapace wider than long, maximum carapace length 70 to 80 percent maximum carapace width, ovate or hexagonal in shape, position of maximum width between one-half to three-quarters of the distance posteriorly on carapace; dorsal surface generally not densely ornamented but may have large spherical swellings, with regions well to very poorly defined; anterolateral margins entire or with spines or lobes; front with a medial sulcus, bi- or quadrilobed, frontal width between one-quarter to two-thirds maximum carapace width; antenna situated outside the supraorbital angle; orbits entire or rarely with clearly defined upper orbital fissures, fronto-orbital width between one-half and two-thirds maximum carapace width; male thoracic sternite 4 with medial sulcus and male sternum may exhibit distinctive, Y-shaped groove pattern (Palaeoxanthopsidae, Tumidocarcinidae, Zanthopsidae; see SCHWEITZER, 2005, for illustrations); sternal sutures 4/5 and 5/6 of both sexes complete or incomplete and sometimes parallel, sutures 6/7 and 7/8 complete; male pleon entirely occupying space between coxae of fifth pereopods; sternite 8 not visible in ventral view; male pleonal somites free or 3–5 fused with suture between somites 4/5 sometimes visible; chelipeds at least weakly heterochelous, sometimes markedly so in males; occlusal

surface of dactylus of major chela with a basal molar tooth; absence of corneous tips of pereopods 2–4; cylindrical propodi of pereopods 2–5. [KARASAWA & SCHWEITZER, 2006, p. 42.] *Cretaceous–Holocene*.

Family ARABICARCINIDAE Schweitzer & Feldmann, 2017

[Arabicarcinidae SCHWEITZER & FELDMANN, 2017, p. 3]

Carapace not much wider than long, length about 94 percent width, widest about one-half of the distance posteriorly on carapace, and moderately vaulted longitudinally; front about 23 percent of maximum carapace width, extended beyond orbits, with 4 blunt spines including inner-orbital spines; orbits rectangular, directed forward, upper-orbital margin entire; outer-orbital spine curving slightly axially; anterolateral margin convex, entire except for small anterolateral spine extending from arcuate epibranchial region; dorsal carapace regions very weakly defined; sternal suture 3/4 incomplete, sutures 4/5 and 5/6 parallel; sternite 7 barely visible in ventral view in female; sternite 8 not visible; telson about as long as somite 6 in female; female pleon reaching middle of sternite 4. [SCHWEITZER & FELDMANN, 2017, p. 3.] *Upper Cretaceous (Coniacian)*.

Arabicarcinus SCHWEITZER & FELDMANN, 2017, p. 3 [**A. arumensis*, p. 4, fig. 1; OD]. Diagnosis as for family. *Upper Cretaceous (Coniacian)*: Saudi Arabia.—FIG. 1a–c. **A. arumensis*, holotype, USNM 636369, view of dorsal carapace (a), oblique anterior view of orbits (b), ventral view of pleon and sternum (c), scale bars, 1 cm (Schweitzer & Feldmann, 2017, fig. 1).

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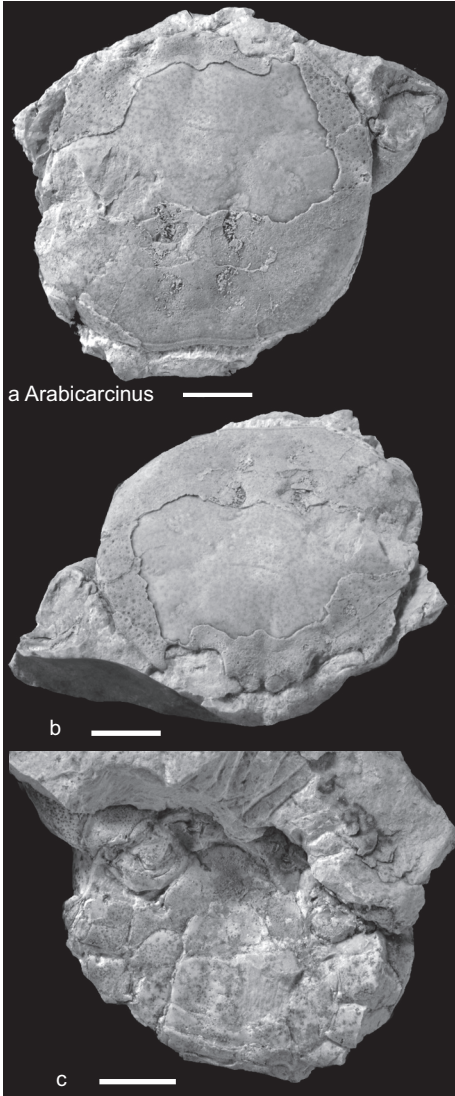


FIG. 1. Arabiacarcinidae (p. 1).

Family CARPILIIDAE Ortmann, 1893

[*nom. transl.* GUINOT, 1978, p. 267, *pro* Carpilinae ORTMANN, 1893, p. 429]

Carapace wider than long, length about 70 to 80 percent maximum carapace width, widest about two-thirds to three-quarters of the distance posteriorly on carapace; may be ornamented with large, flat swellings; regions moderately to poorly defined; grooves not developed except

branchiocardiac groove in some; front usually with bilobed medial projection and blunt inner-orbital spines, thus appearing quadrilobed, but may be produced into downturned, blunt triangle; notch between frontal margin and supraorbital angle indistinct, frontal width averaging 36 percent maximum carapace width; orbits circular, entire, rimmed or beaded, directed forward, fronto-orbital width about one-half to two-thirds maximum carapace width; anterolateral margin may be entire or with blunt lobes or spines; last spine may be extended onto dorsal carapace as short, low ridge; anterolateral margin long, much longer than posterolateral margin, terminating two-thirds to three-quarters of the distance posteriorly, concave, tightly curved posteriorly, often very convex posteriorly; posterolateral margin straight or weakly convex, short, at a very low angle to posterior margin, around 25° – 30° ; posterior margin nearly straight, narrow, averaging about 30 percent maximum carapace width; carapace regions may be weakly inflated or not defined; branchiocardiac groove often defining lateral margins of urogastric region. Buccal frame usually tapering anteriorly; thoracic sternum narrow, rectangular, with subparallel margins; articulation condyle of pereopods on sternum; sternite 3 without medial groove; sutures 4/5–7/8 complete, parallel; sternite 8 not visible in ventral view; male pleonal somites 3–5 fused, pleon filling entire space between coxae of fifth pereopods; chelae large, subequal or heterochelous, with outer, upper, and lower surfaces generally smooth (though upper surface may have blunt nodes); chelipeds much larger than other walking legs; merus fused to basis-ischium; merus and coxa articulating directly; pereopods 2–5 narrow, smooth, tubular; male gonopod 1 weakly curved, stout, with simple apex; male gonopod 2 long with long, filamentous flagellum. [Emended from KARASAWA & SCHWEITZER, 2006, p. 43.] *Paleocene* (*Thanetian*)–*Holocene*.

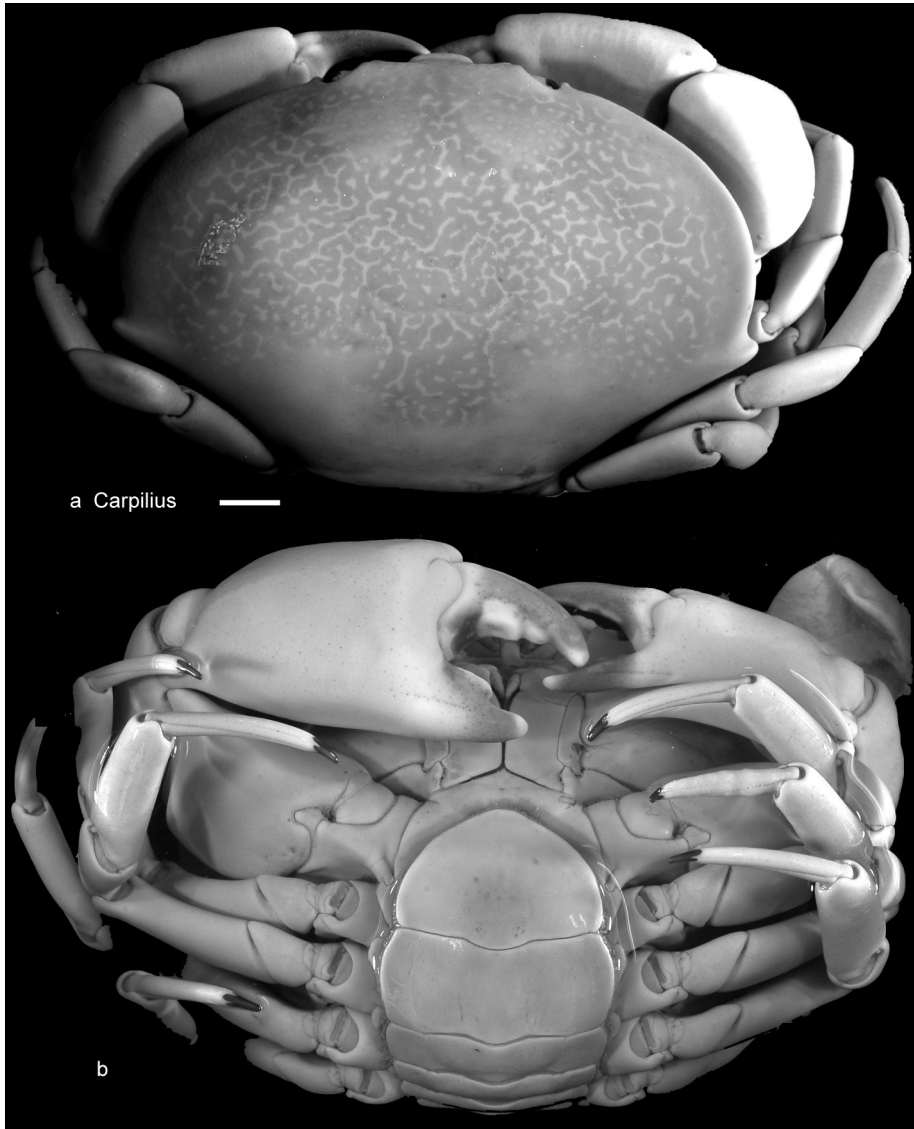


FIG. 2. Carpiliidae (p. 3).

Carpilius DESMAREST, 1823, p. 228 [**Cancer maculatus* LINNAEUS, 1758, p. 626; M]. Front with bilobed projection; orbits small; anterolateral margin with two, blunt projections, the posteriormost largest and extending onto carapace as weak ridge; branchiocardiac groove moderately incised; subtle ridge parallel to anterolateral margin; anterolateral corner positioned in posterior half of carapace. *Eocene–Holocene*: Italy, *Ypresian–Lutetian*; Japan?, *Miocene*; Barbados, *Pliocene*; Taiwan, Jamaica, *Pleistocene*; Indo-Pacific, Caribbean, Brazil, *Holocene*.—FIG. 2*a–b*. *C. corallinus* (HERBST, 1783 in 1782–1804),

USNM 4094, dorsal (*a*) and ventral (*b*) views of female, Caribbean, *Holocene*, scale bars, 1 cm (new). **Braggicarpilius** BESCHIN, BUSULINI, & TESSIER, 2015, p. 79, pl. 5, 1 [**B. marginatus*; OD]. Carapace ovate, moderately vaulted; frontal margin sinuous; orbits oriented anterolaterally; anterolateral margin convex, apparently entire; posterolateral margin weakly concave; carapace regions unmarked; carapace apparently smooth. *Eocene (Ypresian)*: Italy.—FIG. 3, 1. **B. marginatus*, holotype, MCZ 3998, dorsal carapace, scale bar, 1 cm (new; photo by A. Busulini, Museo di Storia naturale, Venezia, Italia).

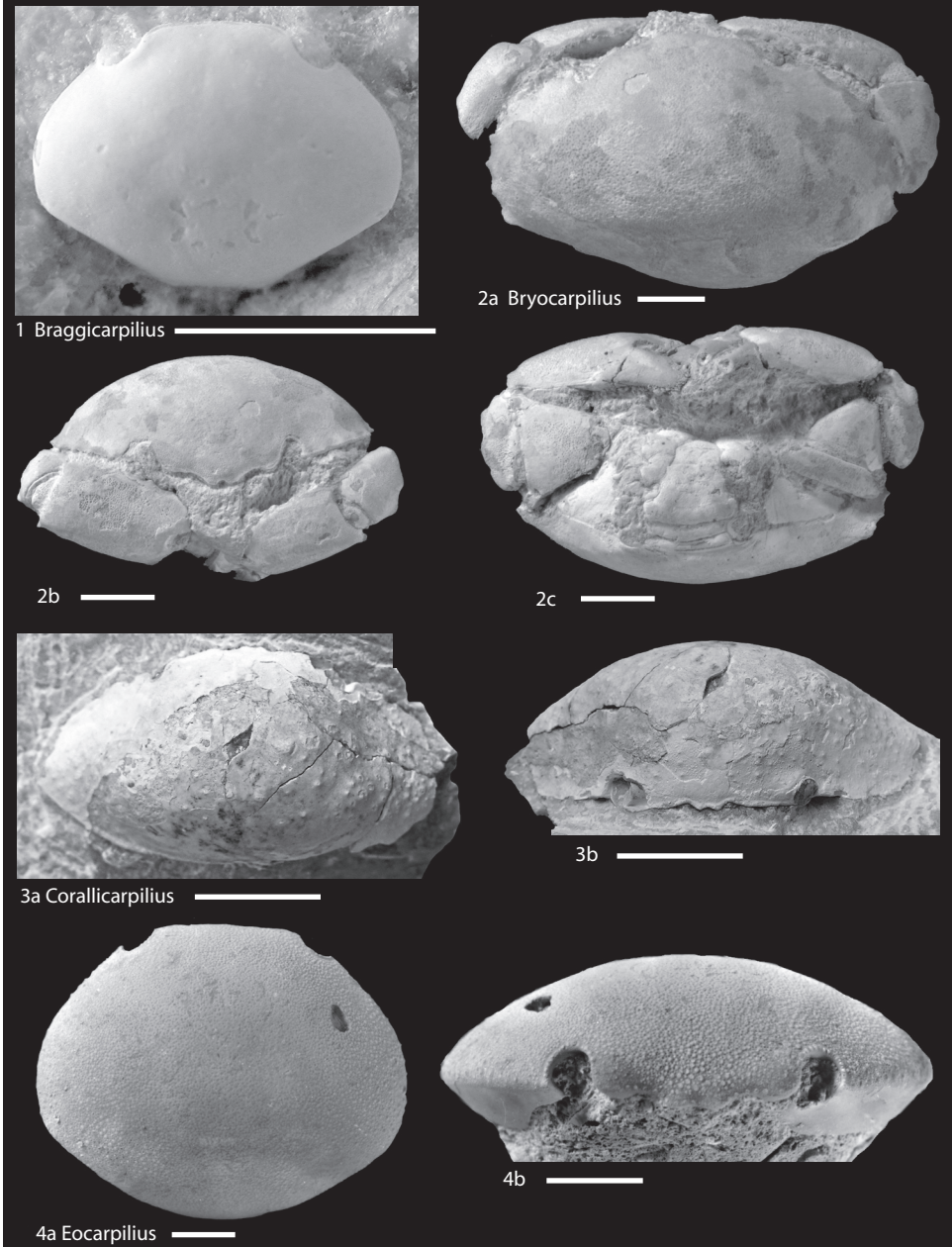


FIG. 3. Carpiliidae (p. 3–5).

Bryocarpilius FELDMANN & others, 2011, p. 345
 [**Palaeocarpilius aquilinus* COLLINS & MORRIS, 1973, p. 284, pl. 29–30; OD]. Carapace ovate, length about two-thirds maximum width, widest about 60 percent of the distance posteriorly; very strongly vaulted longitudinally; front quadrilobed,

weakly projected into a sinuous triangular shape, with two, closely spaced axial lobes and blunt inner-orbital lobes, about 36 percent maximum width, with fronto-orbital width about half maximum carapace width; anterolateral margin with eight or nine, evenly spaced spines including outer-orbital

- spine; posterolateral margin rimmed anteriorly, sometimes with one small spine, at 80° angle to axis, then arcing posteriorly at about 60° angle to carapace; mesogastric region weakly to moderately defined, sometimes with weak, arcuate ridge; chela with row of spines on upper surface and distal half of fingers black. [Emended from FELDMANN & others, 2011.] *Eocene* (Lutetian–Priabonian): Egypt, Libya.—FIG. 3,2a–b. **B. aquilinus* (COLLINS & MORRIS), holotype, SMNS 61866; *a*, dorsal carapace; *b*, anterior view.—FIG. 3,2c. *B. apsidorsalis* FELDMANN & others, 2011, holotype posterior view, Lutetian–Priabonian, Egypt, scale bars, 1 cm (Feldmann & others, 2011, fig. 13,1–3).
- Corrallicarpilius** DE ANGELI & CECCON, 2015, p. 125, fig. 4 [**C. arcuatus*; OD]. Carapace very strongly vaulted longitudinally, strongly transversely ovate; frontal margin sinuous, with bilobed axis, each lobe bounded laterally by shallow concavity; orbits circular; anterolateral margins appearing to be crispate; carapace regions poorly defined and ornamented overall by large, widely spaced tubercles. *Eocene* (Ypresian): Italy.—FIG. 3,3a–b. **C. arcuatus*, holotype, MCV 14/18; *a*, dorsal carapace; *b*, anterior view, scale bars, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).
- Eocarpilius** BLOW & MANNING, 1996, p. 20, fig. 1–2 [**E. carolinensis*; OD]. Carapace strongly vaulted longitudinally, length about 77 percent maximum width, widest about 60 percent of the distance posteriorly; front broad, with two lobes axially and inner-orbital lobes, about 38 percent maximum width; orbits with beaded rim, fronto-orbital width about 55 percent carapace width; anterolateral margin entire, steeply curving posteriorly, and ornamented with fine beads; posterolateral margin weakly convex, short; posterior margin narrow; anterolateral corner situated about two-thirds of the distance posteriorly on carapace. *Eocene* (Lutetian)–*Miocene* (Tortonian): USA (South Carolina), *Lutetian*–*Bartonian*; USA (North Carolina), *Priabonian*; Hungary, Spain, *Langhian*; Austria, Hungary, Poland, *Tortonian*.—FIG. 3,4a–b. *E. blowi* FELDMANN & others, 1998, holotype, CM 36026; *a*, dorsal carapace; *b*, anterior view, Priabonian, North Carolina, scale bars, 1 cm (Feldmann & others, 1998, fig. 13).
- Holocarcinus** WITHERS, 1924, p. 94, pl. 5,1–2 [**H. sulcatus*; M]. Carapace ovate, regions not developed, with two transverse ridges, one extending between first anterolateral protuberances, second extending between protuberances at anterolateral corners; front wide, depressed, triangular; anterolateral margin with two protuberances. *Eocene* (Lutetian): Nigeria.—FIG. 4,1. **H. sulcatus*, holotype (BMNH) In.18455, dorsal carapace, Lutetian, Nigeria, scale bar, 1 cm (new).
- Laticarpilius** FELDMANN & others, 2011, p. 342, fig. 12 [**L. aegypticus*; OD]. Carapace ovoid, length 60 to 70 percent maximum width, widest 55 to 65 percent of the distance posteriorly; rostrum triangular, downturned, frontal width 45 to 50 percent maximum carapace width; orbits small, circular, rimmed, fronto-orbital width 55 to 65 percent maximum carapace width; anterolateral margin composed of two arcs, one gentle, second arc becoming more strongly convex in posterior one-third, with two broadly separated, blunt projections that mark the beginning of the inflection in convexity and the anterolateral angle; last blunt projection extending into rim along posterolateral margin and onto dorsal carapace; posterolateral margin initially at 80° angle to axis, then curving at 60° angle to axis; chelae stout, smooth. [Emended from FELDMANN & others, 2011.] *Eocene*: Egypt, India.—FIG. 4,2a–b. **L. aegypticus*, holotype, SMNS 67895/1, *Eocene*, Egypt; *a*, dorsal carapace; *b*, ventral view, scale bars, 1 cm (Feldmann & others, 2011, fig. 12,1–2).
- Liopsalis** VON MEYER, 1862, p. 163 [**Cancer klipsteini* VON MEYER, 1842, p. 589; M]. Carapace ovate, wider than long, length 70 to 78 percent maximum carapace width, widest 55 to 67 percent of the distance posteriorly at anterolateral corner; front triangular, downturned, weakly sinuous, 36 to 50 percent maximum carapace width; orbits circular, directed forward, 60 to 70 percent maximum carapace width; anterolateral margins entire, tightly convex; rim along posterolateral margin and onto dorsal carapace; posterolateral margin initially at 80° angle to axis, then curving at 60° angle to axis; upper margin of chela with stout spines. [FELDMANN & others, 2011.] *Eocene* (Lutetian): India, Pakistan, Spain. *Eocene*: Germany, Italy.—FIG. 4,3. **L. klipsteini* (VON MEYER), specimen number and scale unknown (von Meyer, 1862, pl. 17,9).
- Lovaracarpilius** BESCHIN & others, 2016, p. 55, pl. 9,4 [**L. incisus*; OD]. Carapace round-oval, moderately vaulted longitudinally; front triangular; orbits directed slightly anterolaterally; anterolateral margins with two, small spines posteriorly; posterolateral margin slightly convex; weak groove defining anteriormost limit of epibranchial region; urogastric and cardiac regions moderately defined laterally; carapace surface punctate. *Eocene* (Lutetian): Italy.—FIG. 4,4a–b. **L. incisus*, holotype, MCZ.3913-I.G.361726; *a*, dorsal carapace; *b*, anterior view, scale bars, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).
- Montemagralia** DE ANGELI & CECCON, 2016, p. 130, fig. 2 [**M. lata*; OD]. Carapace much wider than long, transversely ovate, strongly vaulted longitudinally, especially in anterior one-third, and moderately vaulted transversely; front wide, straight; orbits circular, directed forward; anterolateral margins rimmed. *Eocene* (Ypresian): Italy.—FIG. 4,5a–b. **M. lata*, holotype, MCV.15/353-I.G.369329; *a*, dorsal carapace; *b*, anterior view, scale bars, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).
- Ocalina** RATHBUN, 1929, p. 1, pl. 1–3 [**O. floridana*, OD]. Carapace wider than long, length 63 to 73 percent maximum carapace width, maximum width

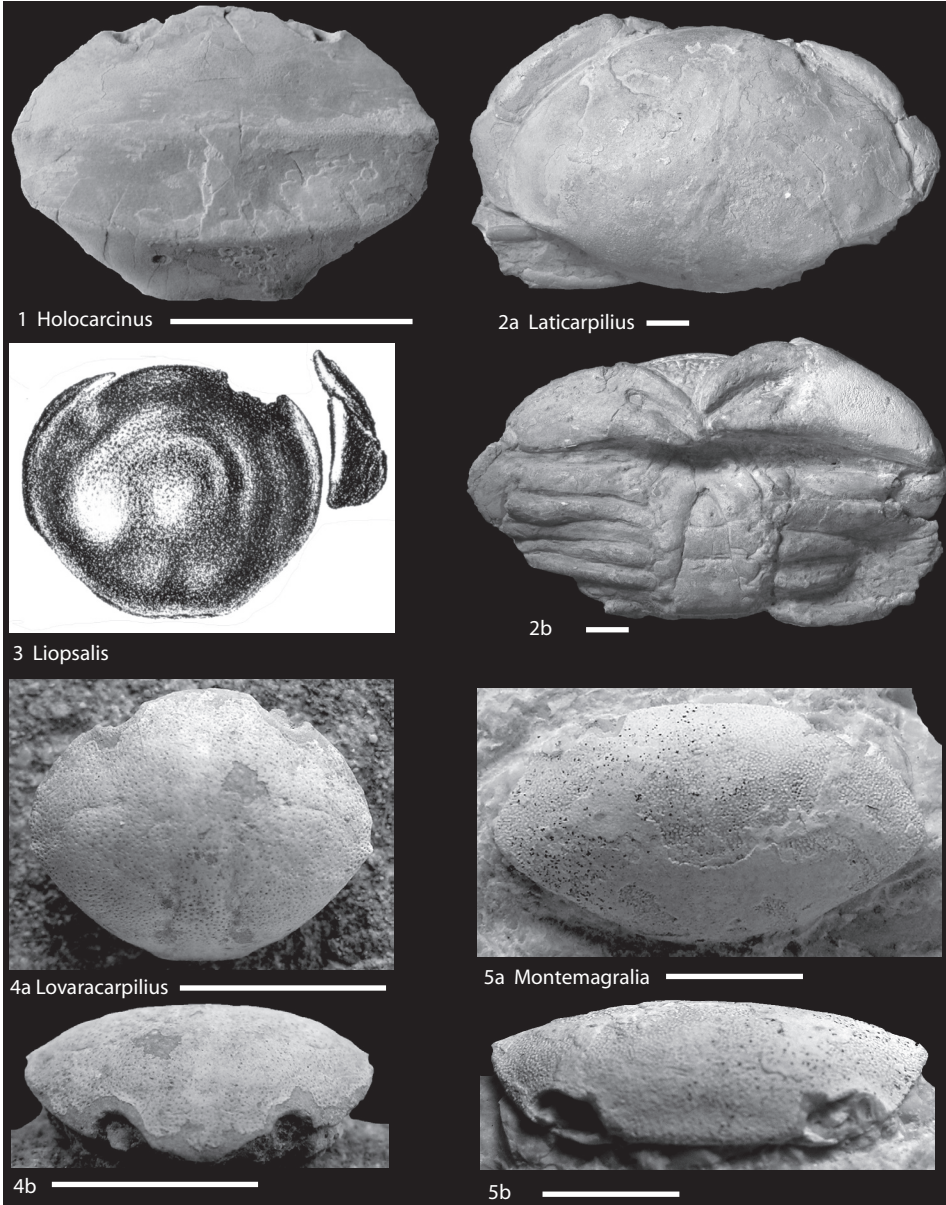


FIG. 4. Carpiliidae (p. 5).

position about 60 percent of the distance posteriorly; surface ornamented with large tubercles, most prominently on anterior and anterolateral surfaces; front with two, prominent lobes flanking axis and two, smaller lobes near inner orbital corner, 35 to 40 percent maximum carapace width; orbits rimmed and granular, with fronto-orbital width 50 to 55 percent maximum carapace width; anterolateral margin lobulate or with at least nine,

large, blunt projections; posterior margin with one or a few, blunt projections anteriorly; carapace regions poorly defined; chelae with rows of large granules. *Eocene*: Netherlands Antilles (Bonaire), *Lutetian*; Egypt, Jamaica, Senegal, USA (Florida), *Eocene*.—FIG. 5, 1a–b. *O. delicata* FELDMANN & others, 2011, holotype, SMF X/m69a1, *Eocene*, Egypt; a, dorsal view; b, anterior view, scale bars, 1 cm (Feldmann & others, 2011, fig. 14, 1–2).

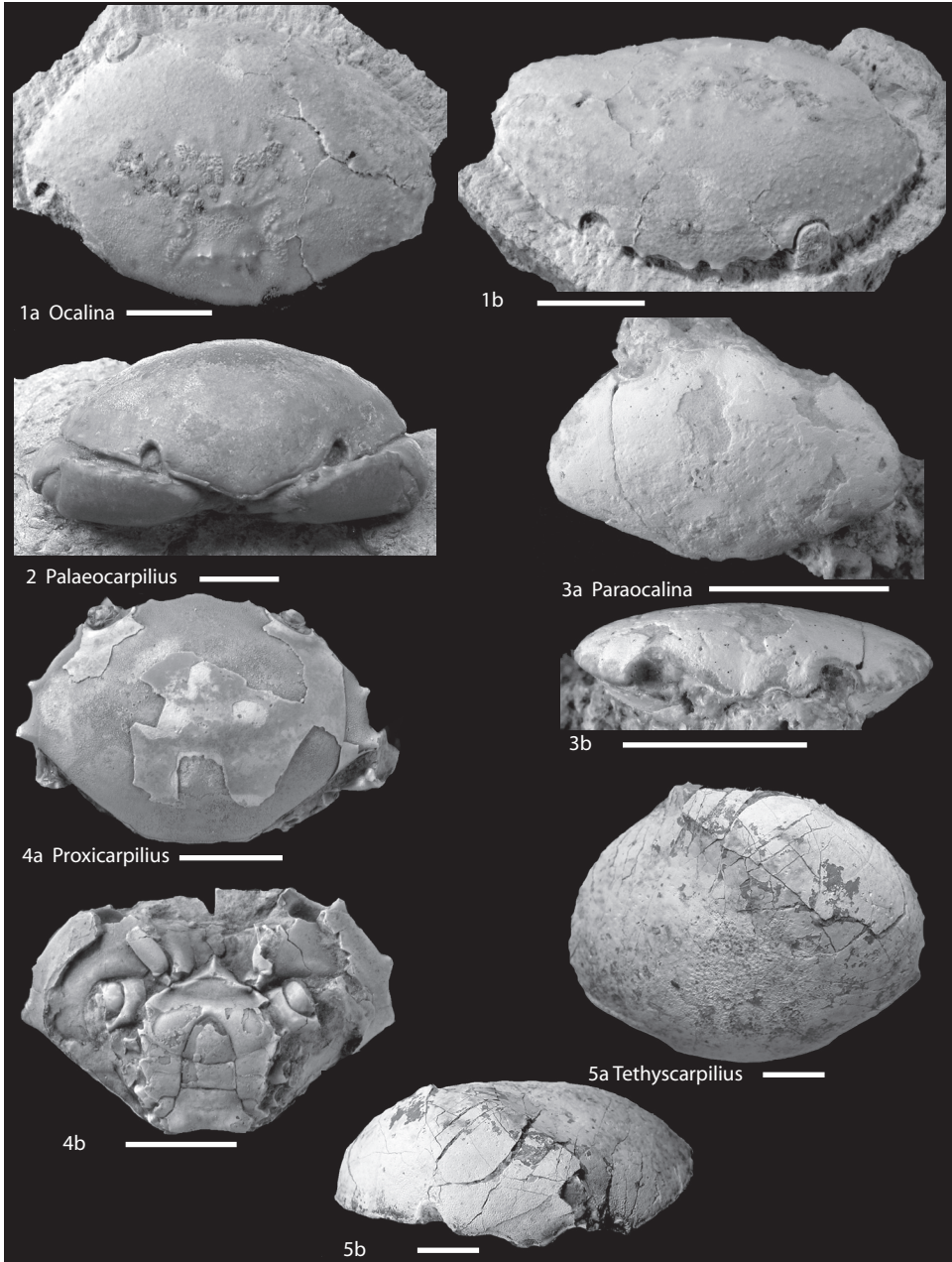


FIG. 5. Carpiliidae (p. 5–8).

Palaeocarpilius A. MILNE-EDWARDS, 1862, p. 51
 [**Cancer macrochelus* DESMAREST, 1822, p. 91,
 pl. 7, 1–2; SD GLAESSNER, 1929, p. 291]. Carapace
 wider than long, length about 75 percent
 maximum carapace width; widest about 70
 percent of the distance posteriorly, smooth;

front downturned, triangular, may have a small
 axial sulcus at tip, about 40 percent maximum
 carapace width; orbits small, circular, entire;
 fronto-orbital width about 60 percent maximum
 carapace width; anterolateral margins long,
 very tightly convex, with seven to nine spines

or blunt projections including outer-orbital spine; well-developed ridge extending onto dorsal carapace from last anterolateral spine; posterolateral margin initially at about 80° angle, then becoming more gentle, at about 60° angle to axis; chelae generally massive, with spines on upper margin. [Emended from SCHWEITZER, 2003.] *Eocene* (Bartonian)—*Miocene*: France, *Bartonian*; Egypt, Hungary, Italy, Romania, *Priabonian*; India, Italy, USA (Mississippi), *Eocene*; Norway, *Eocene–Oligocene*; France, Italy, India, *Rupelian*; Tanzania; U.S. Territories (Northern Mariana Islands), *Miocene*.—FIG. 5,2. **P. macrochelus* (DESMAREST), MCZ 1191, *Eocene*, Italy, scale bars, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Paraocalina BESCHIN & others, 2007, p. 42, pl. 6,1 [**P. multilobata*, OD]. Carapace wider than long, ovate, strongly vaulted; front with four lobes; orbits round; anterolateral margin with five, broad lobes divided by shallow notches, the fifth extending onto dorsal carapace as a weak ridge; posterolateral margins at very low angle to axis, converging strongly posteriorly; dorsal carapace without ornamentation. *Eocene* (*Ypresian*): Italy.—FIG. 5,3a–b. **P. multilobata*, holotype, MCZ 1810, *a*, dorsal carapace; *b*, anterior view, scale bars, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Proxicarpilius COLLINS & MORRIS, 1978, p. 972, pl. 117,5–6, 118,1–4, 7 [**P. planifrons*; OD]. Carapace ovate, wider than long; front downturned, triangular, about 40 percent maximum carapace width; orbits rimmed, about 65 percent maximum carapace width; anterolateral margins with four spines or projections, including outer-orbital spine; metagastric region with transverse ridge, urogastric and cardiac region with longitudinal ridge intersecting metagastric ridge forming a cross shape; sternite 4 with oblique ridge where telson intersects it. *Paleocene* (*Thanetian*), *Eocene*: Pakistan.—FIG. 5,4a–b. **P. planifrons*, KSU D 302, *Eocene*, Pakistan; *a*, dorsal carapace; *b*, ventral view, scale bars, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Tethyscarpilius DE ANGELI & ALBERTI, 2016, p. 122, fig. 2–3 [**T. bericus*; OD] Carapace ovate, wider than long, smooth; front with rounded-triangular projection axially, projection itself axially sulcate; anterolateral margins with tiny spines posteriorly with concave margin between spines, yielding scalloped appearance; ridge extending onto dorsal carapace at anterolateral corner. *Eocene* (*Priabonian*): Italy, USA (Florida).—FIG. 5,5a–b. **T. bericus*, holotype, MCZ.446-I.G.367043, *Priabonian*, Italy; *a*, dorsal carapace; *b*, anterior view, scale bars, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Family PALAEOXANTHOPSIDAE Schweitzer, 2003

[Palaeoxanthopsidae Schweitzer, 2003, p. 1120]

Carapace wider than long, maximum carapace length about 75 percent maximum carapace width, position of maximum width about one-half to two-thirds of the distance posteriorly; regions defined by grooves, moderately or deeply incised, with V-shaped groove separating gastric regions from hepatic and branchial regions; regions may be moderately or weakly inflated, often with large, spherical swellings; frontal width about 20 percent maximum carapace width; front quadrilobed, medial two lobes may project well beyond orbits; orbits with two fissures or sutures, rectangular, sometimes rimmed, outer-orbital angle a projected spine, fronto-orbital width about half maximum carapace width; anterolateral margin with a straight segment followed by three to five spines, not including outer-orbital spine; spines well separated by notches or fissures, with last spine longest, directed laterally or posterolaterally; posterior margin narrow, concave, about one-quarter maximum carapace width; branchial regions often with linear, transverse swellings. Male sternum with no evidence of suture between sternites 2 and 3; with distinctive, Y-shaped groove pattern on sternites 3 and 4; sternal suture 3/4 oriented at steep angle; sternite 4 with large episternal projection; sternite 4 with very clear, longitudinal grooves near lateral margins, which appear to be episternal projections from sternite 3 fused with and prominent on sternite 4; male pleonal somites free. Female sternum with deep suture between sternite 2/3; groove from pleonal cavity extending anteriorly onto sternite 4; pleon reaching level of base of coxae of pereopods 1. [Emended from KARASAWA & SCHWEITZER, 2006, p. 44.] *Upper Cretaceous–Eocene*.

Jakobsenius SCHWEITZER, 2005, p. 289 [**Xanthilites cretacea* SEGERBERG, 1900, p. 375, pl. 9,19–20; OD]. Carapace wider than long, maximum width about 60 percent of distance posteriorly; carapace

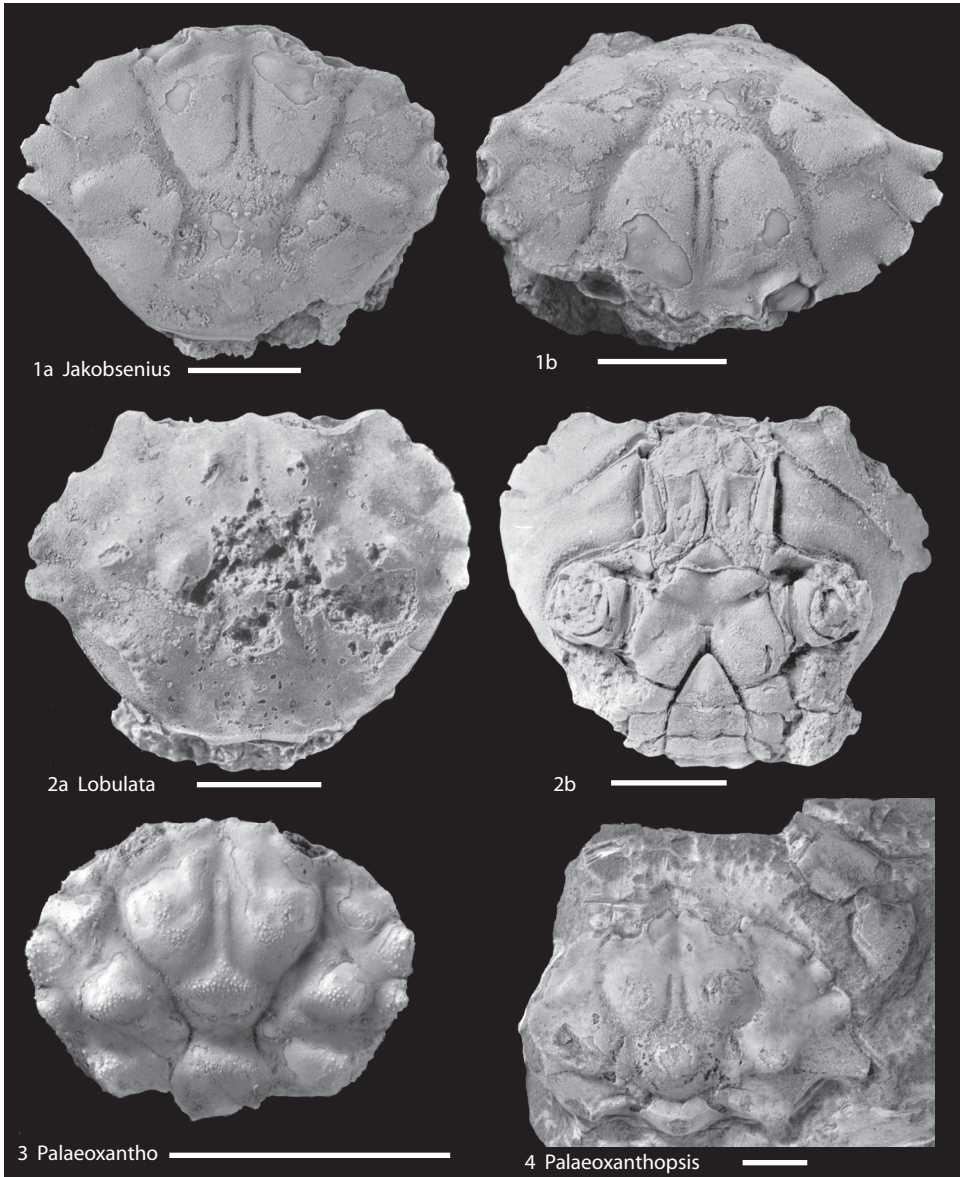


FIG. 6. Palaeoxanthopsidae (p. 8–10).

strongly vaulted longitudinally in anterior one-third; front downturned, appearing to have had four spines, about 30 percent maximum carapace width; orbits directed forward, with two fissures, fronto-orbital width about half carapace width; anterolateral margins with four spines excluding outer-orbital spine, with first spine small, almost a straight segment, second and third spines with rectangular bases and triangular tips, and last spine sharp, directed anterolaterally; all spines separated

by broad fissures; regions moderately well defined; protogastric region bounded by deep grooves; epibranchial region arcuate. *Paleocene (Danian)*: Denmark, Sweden.—FIG. 6, 1a–b. **J. cretaceus* (SEGERBERG), KSU D 37, cast of holotype, MGUH 2483, Danian, Denmark; a, dorsal carapace; b, oblique anterior view, scale bars, 1 cm (new).

Lobulata SCHWEITZER, FELDMANN, & GINGERICH, 2004, p. 108 [**Lobonotus lobulata* FELDMANN & others, 1995, p. 11, fig. 7; OD]. Carapace wider

- than long, maximum carapace width over half the distance posteriorly; fronto-orbital width about half maximum carapace width; anterolateral margins with four spines excluding outer-orbital spines, all broadly separated by deep notches, last spine narrowest but longest; protogastric and axial regions with central tubercles; epibranchial region arcuate; sternum narrow, with Y-shaped groove pattern on sternites 3 and 4; sternal suture 3/4 oriented at steep angle; male pleonal somites free. *Upper Cretaceous (Maastrichtian)*–*Paleocene (Danian)*: Argentina. *Eocene*: Italy?—FIG. 6,2*a–b*. **L. lobulata* (FELDMANN & others), holotype, GHUNLPam 7011, Danian, Argentina; *a*, dorsal carapace; *b*, ventral surface, scale bars, 1 cm (Feldmann & others, 1995, fig. 7,1–2).
- Palaeoxantho** BISHOP, 1986, p. 607, fig. 6 [**P. libertiensis*; OD]. Carapace wider than long; regions well defined as swellings; anterolateral margins upturned in anterior view, with four lobes; front with two lobes; orbits with two fissures. *Upper Cretaceous (Maastrichtian)*: USA (Mississippi).—FIG. 6,3. **P. libertiensis*, holotype GSCM 1692, scale bar, 1 cm (new).
- Palaeoxanthopsis** BEURLIN, 1958, p. 11 [**Zanthopsis cretacea* RATHBUN, 1902, p. 43, pl. 5; OD] [= *Paraxanthopsis* VEGA, FELDMANN, & others, 2001, p. 323 (type, *P. meyapaquensis*, p. 233, fig. 4, OD)]. Carapace wider than long, widest about 65 percent of the distance posteriorly, strongly vaulted longitudinally, moderately vaulted transversely; carapace regions strongly inflated, often ornamented with large swellings; front triangular and axially notched, with spines on either side of notch and with inner-orbital spines; frontal width about 20 percent maximum carapace width; orbits square, with two fissures; fronto-orbital width about half maximum carapace width; anterolateral margins long, convex, with straight segment followed by three spines, the last spine longest, stout, directed posterolaterally; posterolateral margins short, sinuous; swellings on epibranchial and branchial regions forming transverse ridges. *Upper Cretaceous (Maastrichtian)*: Brazil, Mexico, U.S. Territory (Puerto Rico).—FIG. 6,4. **P. cretacea* (RATHBUN), syntype, USNM 73709, Maastrichtian, Brazil, scale bar, 1 cm (new).
- Paraverrucoides** SCHWEITZER, 2003, p. 1123 [**Xanthilites alabamensis* RATHBUN, 1935, p. 91, pl. 20,3–16; OD]. Carapace wider than long, widest about 70 percent of the distance posteriorly, regions moderately defined, ornamented with large swellings; front with four lobes, about 20 percent maximum carapace width; orbits with two, fused fissures; anterolateral margins with three spines, excluding outer-orbital spine, the last spine longest and directed laterally; epibranchial region arcuate, branchial region with spinelike swelling. *Paleocene (Danian–Thanetian)*: USA (Texas), *Selandian*; Mexico (Coahuila), USA (Alabama), *Thanetian*.—FIG. 7,1. **P. alabamensis* (RATHBUN), holotype, USNM 371718, Thanetian, Alabama, dorsal carapace, scale bar, 1 cm (new).
- Remia** SCHWEITZER, 2003, p. 1123 [**Xanthopsis africana* REMY & TESSIER, 1954, p. 187, pl. 11,1; OD]. Carapace ovate, grooves deep, regions with discrete, large swellings; anterolateral margin short, with three spines, excluding outer-orbital spine, the last longest; branchial regions strongly inflated axially. *Upper Cretaceous (Maastrichtian)*: Senegal.—FIG. 7,2. **R. africana* (REMY & TESSIER), KSU D 1100, cast of holotype MNHN R03885, scale bar, 1 cm (new).
- Rocarcinus** SCHWEITZER, 2005, p. 288 [**Xanthilites gerthi* GLAESSNER, 1930, p. 5, fig. 2; OD]. Carapace wider than long, length about 80 percent carapace width, widest a little over half the distance posteriorly; front wide, downturned, with two medial spines and weak inner-orbital spines; orbits rimmed, with two fissures, fronto-orbital width about half maximum carapace width; anterolateral margins upturned in anterior view, with 4 spines excluding outer-orbital spine, first spine nearly straight, second and third spines with rectangular bases and triangular tips, edges serrate, and last spine longest, directed laterally, deep fissures separating each anterolateral spine; carapace regions moderately developed; sternum narrow, with Y-shaped groove pattern on sternites 3 and 4; sternal suture 3/4 oriented at steep angle; female pleonal somites free. *Upper Cretaceous (Maastrichtian)*–*Paleocene (Danian)*: Argentina.—FIG. 7,4*a–b*. **R. gerthi* (Glaessner), holotype, Glaessner 1, UBIP, Danian, Argentina; *a*, dorsal carapace; *b*, ventral view, scale bars, 1 cm (Feldmann & others, 1995, fig. 9,3–4).
- Verrucoides** VEGA, COSMA, & others, 2001, p. 940 [**Xanthilites verrucoides* COLLINS & RASMUSSEN, 1992, p. 38, fig. 21; OD]. Carapace wider than long, widest about 65 percent the distance posteriorly; regions moderately defined, ornamented with large tubercles; front with four spines including inner orbital spines, about 25 percent carapace width; orbits rectangular, with two fissures, fronto-orbital width about half carapace width; anterolateral margin with four spines excluding outer-orbital spine, first three spines with rectangular bases and triangular tips, separated by U-shaped fissures, last anterolateral spine long, directed posterolaterally; protogastric, mesogastric, cardiac, epibranchial, and branchial regions with distinctive large tubercles. *Paleocene–Eocene (Ypresian)*: Greenland, *Paleocene*; Mexico (Chiapas), *Ypresian*.—FIG. 7,3. **V. verrucoides* (COLLINS & RASMUSSEN), KSU D 1803, cast of holotype MGUH 21.612, Paleocene, Greenland, scale bar, 1 cm (new).

Family TUMIDOCARCINIDAE Schweitzer, 2005

[Tumidocarcinidae SCHWEITZER, 2005, p. 282] [=Eogeryonidae OSSO, 2016, p. 234]

Carapace wider than long, length 80 to 90 percent maximum carapace width, widest at position of last or penultimate

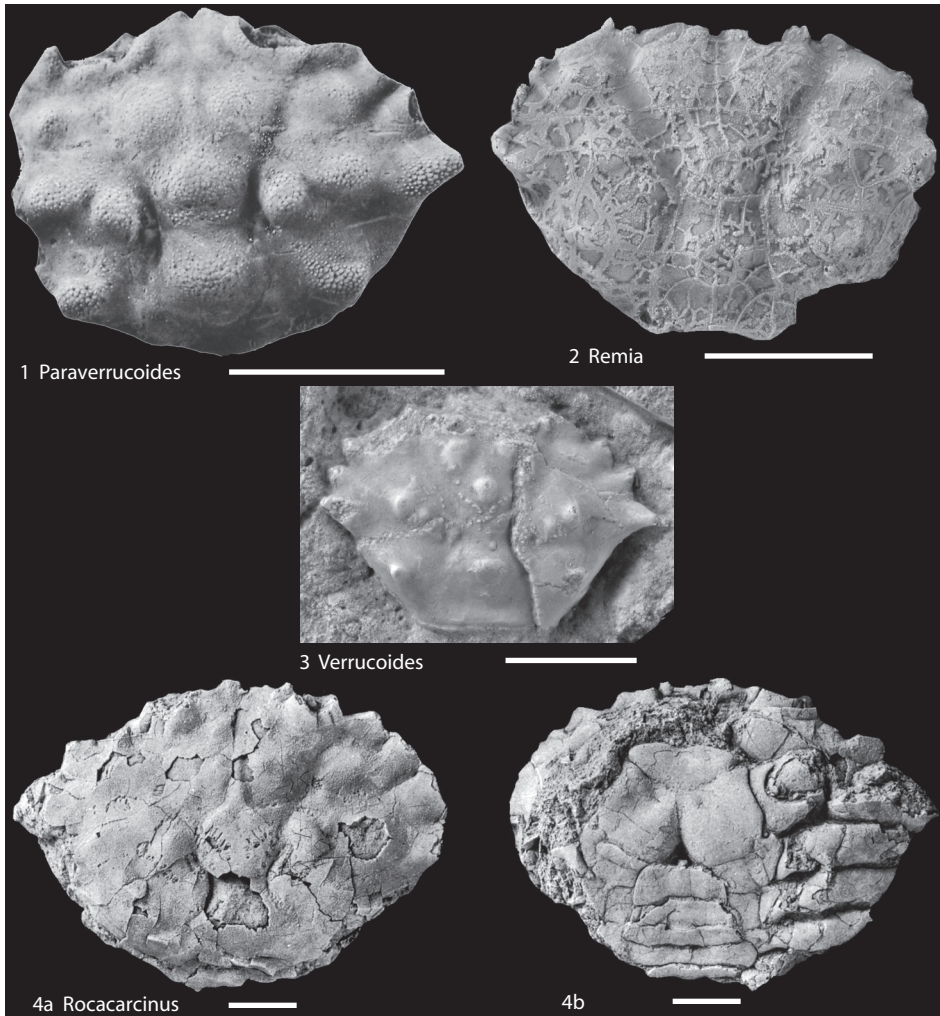


FIG. 7. Palaeoxanthopsidae (p. 10).

anterolateral spine, about half of the distance posteriorly on carapace; carapace markedly vaulted longitudinally, especially in anterior third; front four-lobed, including inner-orbital spines, frontal width about one-quarter maximum carapace width; fronto-orbital width a little less than half to two-thirds maximum carapace width; orbits rimmed, sometimes with one or two very faint, completely fused fissures, circular, directed forward; antenna situated outside supraorbital angle; carapace regions well to poorly defined; anterolateral margins with

three or four small, blunt spines, excluding outer-orbital spine or entire and granular; epibranchial regions usually arcuate; male sternites 1 and 2 fused with no evidence of suture; sternites 2 and 3 with very clear, deep, and continuous suture between them; sternites 3 and 4 with notch in lateral margins where suture intersects them, with suture becoming increasingly shallow, a shallow groove at midlength and completely interrupted axially; left and right sternal sutures between sternites 3 and 4 merge with deep groove extending anteriorly from sterno-

pleonal cavity, forming prominent, Y-shaped groove pattern; suture between sternites 3 and 4 oriented at high angle; sternite 4 with very clear, longitudinal grooves near lateral margins that appear to be episternal projections from sternite 3 fused with and prominent on sternite 4; sternal sutures not parallel; sternite 8 not visible in ventral view; male pleon barely or not quite reaching posterior margin of coxae of first pereopods; all male pleonal somites free; male pleon completely occupying space between coxae of fifth pereopods; chelae subequal to very unequal; mani stout; fingers with black tips; coxae of first pereopods articulating with basis-ischium; basis-ischium not fused to merus; other pereopods slender. [Emended from KARASAWA & SCHWEITZER, 2006, p. 44.] *Upper Cretaceous (Cenomanian)–Miocene.*

Agostella OSSÓ-MORALES, 2011, p. 414, fig. 4, 1–5 [**A. terrersensis*; OD]. Carapace ovate, wider than long; front broadly bilobed with diminished inner-orbital spines; orbits with two, closed fissures; anterolateral margins short, with four spines including outer-orbital spine, third spine short and blunt; regions well defined, epibranchial arc high, intestinal region and posteriormost branchial region depressed well below level of rest of carapace; sternum granular. *Eocene (Lutetian)*: Spain.—FIG. 8, 1a–b. **A. terrersensis*, holotype, MGB 57606; a, dorsal carapace; b, ventral surface, scale bars, 1 cm (new; photos by A. Ossó, Tarragona, Spain).

Baricarcinus CASADÍO & others, 2004, p. 98, fig. 7A–B, D–E [**B. mariae*; OD]. Carapace length about 85 percent width, regions not defined, strongly vaulted longitudinally; front bilobed; orbits circular, entire, fronto-orbital width about 65 percent maximum carapace width; anterolateral margin short, with three, blunt protuberances, not including outer-orbital angle, third one largest; epibranchial regions arcuate. *Oligocene*: Argentina.—FIG. 8, 2. **B. mariae*, KSU D252, scale bar, 1 cm (new).

Cyclocorystes BELL, 1858, p. 24, pl. 4, 1–2 [**C. pulchellus*; M]. Carapace not much wider than long, length about 90 percent maximum carapace width, widest at position of last anterolateral spine, narrowing markedly posteriorly; carapace moderately vaulted transversely and longitudinally; regions moderately well defined as swellings; anterolateral spines small; orbits with two fissures; fronto-orbital width about half maximum carapace width. *Eocene (Ypresian–Lutetian)*: UK (England).—FIG. 8, 3. **C. pulchellus*, holotype, (BMNH) In. 59101, Ypresian–Lutetian, England, scale bar, 1 cm (new).

Dynomenopsis SECRETAN, 1972, p. 2, pl. 1, 1–2 [**D. branisai*; M]. Carapace wider than long, about

three-quarters maximum carapace width; regions moderately well defined; fronto-orbital width about two-thirds maximum carapace width; orbits with two fissures, with forward-directed outer-orbital spine; anterolateral margin with three, short, triangular, and anteriorly directed spines, excluding outer-orbital spine, second largest; posterolateral margin straight; posterior margin with concavities at lateral edges, straight centrally; mesobranchial region with transverse, granular ridge; posterior pereopods apparently slender. *Upper Cretaceous (Cenomanian)*: Bolivia.—FIG. 8, 4. **D. branisai*, holotype, MNHN A.33498, scale bar, 1 cm (new).

Eogeryon OSSÓ, 2016, p. 235, fig. 4–5 [**E. elegius*; OD]. Carapace about as long as wide, hexagonal, widest at position of third anterolateral spine about one-third of distance posteriorly on carapace; front with 4 spines, including inner-orbital spines; orbits square, with two fissures and long outer-orbital spine curving axially; anterolateral margins with four spines, including outer-orbital spines, last smallest; posterolateral margins sinuous; regions moderately defined; sternum narrow, small portions of sternites 5 and 6 visible, sternites 7 and 8 not visible in ventral view; all male pleonal somites free; chelae apparently massive, with black fingers and molariform teeth on occlusal surfaces. *Upper Cretaceous (Cenomanian)*: Spain.—FIG. 8, 5a–b. **E. elegius*, holotype, MGB 69151; a, dorsal carapace; b, ventral view, scale bars, 1 cm (new; photos by A. Ossó, Tarragona, Spain).

Lobonotus A. MILNE-EDWARDS, 1863, pl. 10, 4; 1864, p. 39 [**L. sculptus*; M] [= *Archaeopilumnus* RATHBUN, 1919, p. 177 (type, *A. caelatus*, p. 177, pl. 6, 6–7, 7, 10–13, 8, 4–7, M)]. Carapace not much wider than long, length about 85 percent maximum width; regions well defined, ornamented with tubercles; front nearly straight, with central notch, about 33 percent maximum carapace width; orbits with two fissures and sometimes inner spine; fronto-orbital width about 65 percent carapace width; anterolateral margin with four or five spines excluding outer-orbital spine; cardiac region with distinct, arcuate swellings paralleling lateral margins; male pleonal somites free, completely covering space between coxae of pereopod 5; sternite 8 not visible in ventral view. *Eocene (Lutetian)–Oligocene*: Italy, *Lutetian*; USA (South Carolina), *Lutetian–Bartonian*; USA (North Carolina), *Priabonian*; Borneo, Mexico (Baja California), USA (Louisiana, Texas), *Eocene*; Caribbean, *Oligocene*.—FIG. 9, 1. *L. natchitochensis* STENZEL, 1935, cast of holotype, UT21168 (numbered KSU D 87), Eocene, Louisiana, scale bar, 1 cm (new).

Nitotarcinus SCHWEITZER & others, 2007, p. 292 [**Glyphithyreus bituberculatus* COLLINS & JAKOBSEN, 2003, p. 74, pl. 5; OD]. Carapace not much wider than long, regions well defined; front axially notched, about 33 percent maximum carapace width; orbits with two fissures or with blunt intraorbital spine, fronto-orbital width about 65 percent maximum carapace width; anterolateral margins with three or four spines or blunt

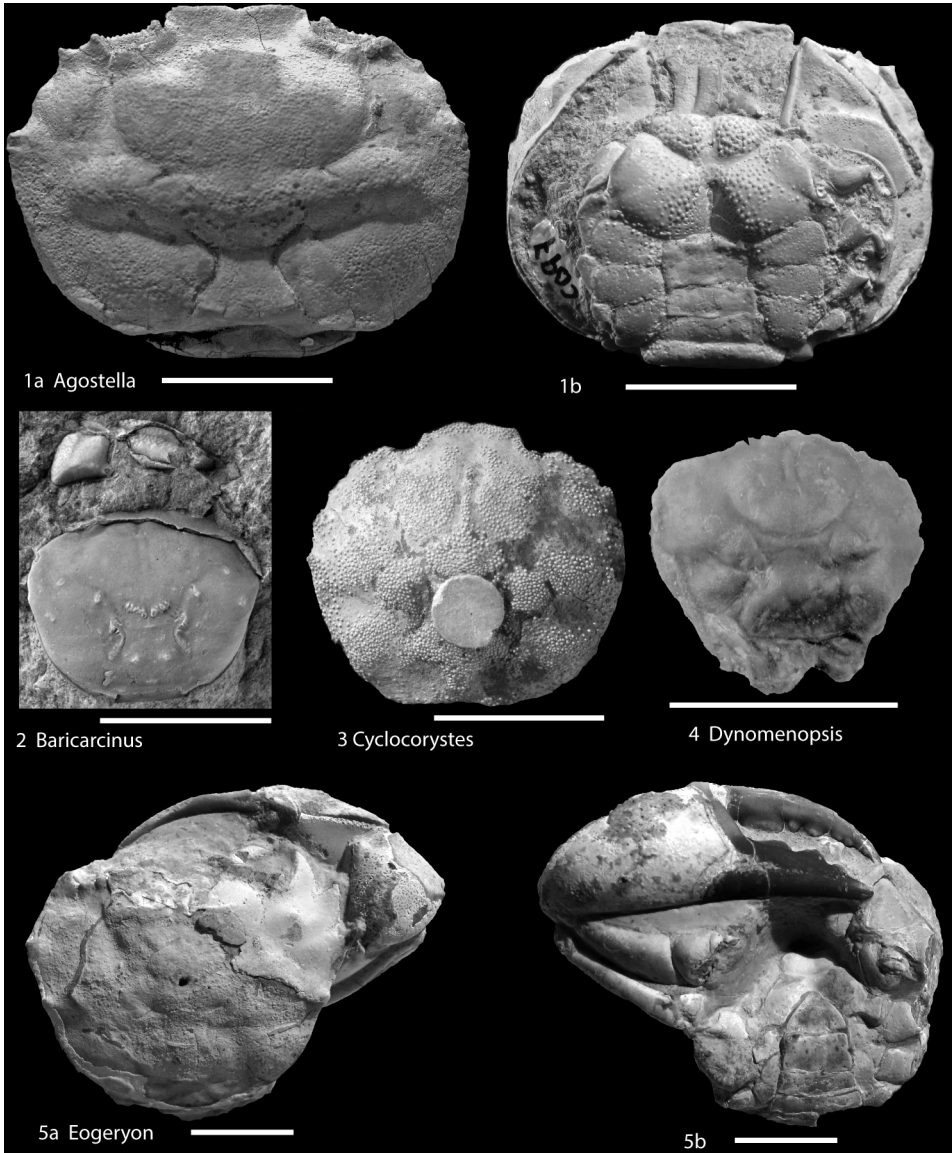


FIG. 8. Tumidocarcinidae (p. 12).

projections, excluding outer-orbital spines. *Eocene*: Argentina; Canada (British Columbia), Denmark; UK (England).—FIG. 9, 2a–b. **N. bituberculatus* (COLLINS & JAKOBSEN), holotype, Eocene, Denmark; a, holotype, MGUH 26794, dorsal view; b, paratype, MGUH 26796, ventral surface, scale bars, 1 cm (Collins & Jakobsen, 2003, pl. 5, 2a, 4a; with permission from BMFM).

Paratumidocarcinus MARTINS-NETO, 2001, p. 244, pl. 2C [**P. marajoarus*; OD]. Carapace not much wider than long; anterolateral margins entire; carapace

strongly vaulted longitudinally; chelipeds strong, weakly heterochelous. *Miocene*: Brazil.—FIG. 9, 3. **P. marajoarus*, holotype, RGMN-T06, scale bar, 1 cm (Martins-Neto, 2001, fig. 2C, permission granted by UNISINOS Editorial Office).

Paronacarcinus BESCHIN, BUSULINI, & TESSIER, 2009, p. 15, pl. 3, 3–5 [**P. spinosus*; OD]. Carapace hexagonal, wider than long; orbits with two notches bounding intraorbital spine; anterolateral margins shorter than posterolateral margins, with four spines excluding outer-orbital spine;

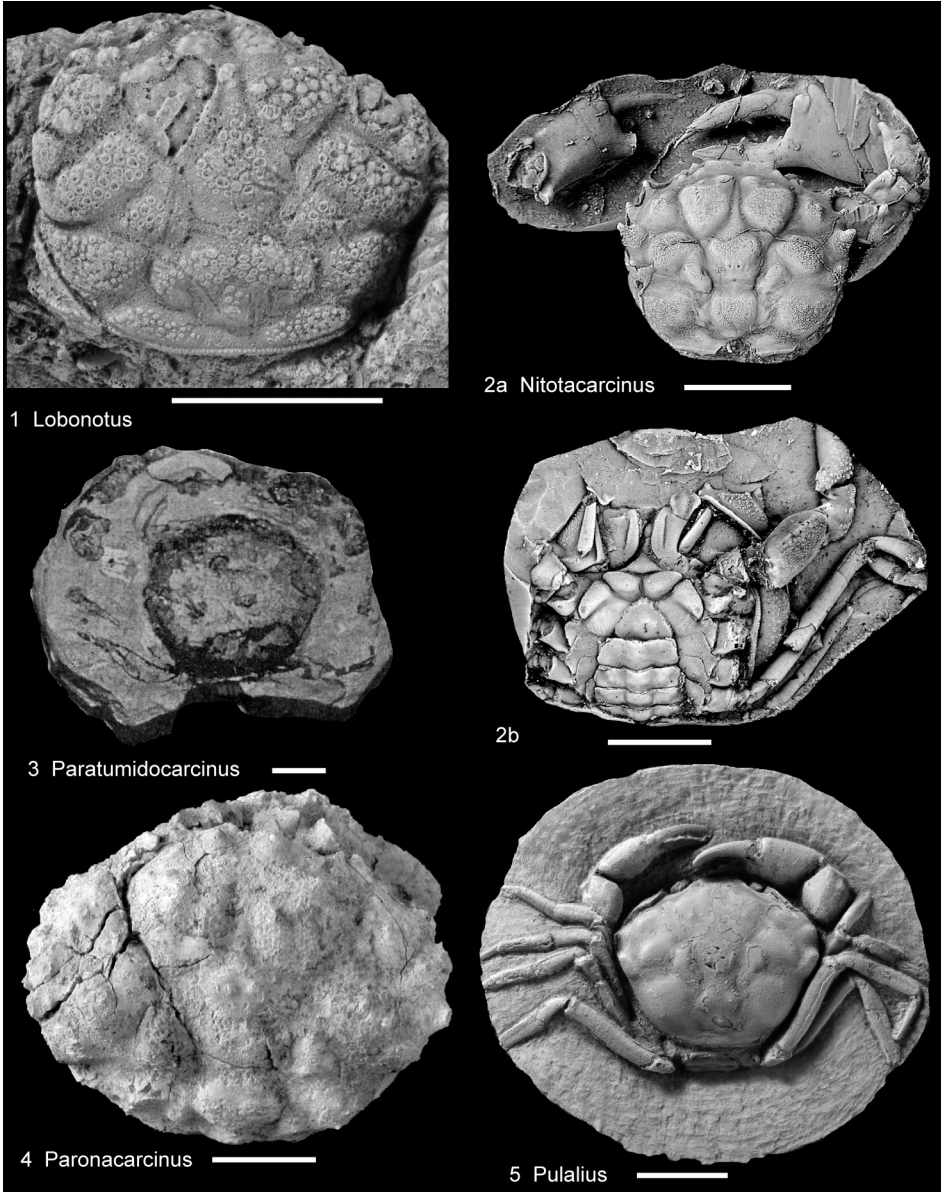


FIG. 9. Tumidocarcinidae (p. 12–14).

proto gastric region with longitudinal groove. *Eocene* (*Priabonian*): Italy.—FIG. 9,4. **P. spinosus*, holotype, MCZ 3097-I.G.336826, scale bar, 1 cm (new; photo by C. Beschin, Museo Civico “G. Zannato,” Montecchio Maggiore, Italy).

Pulalius SCHWEITZER & others, 2000, p. 41 [*Zanthopsis vulgaris* RATHBUN, 1926, p. 48, pl. 13–14; OD]. Carapace ovate or hexagonal; carapace regions inflated; front four-lobed; orbits

circular, rimmed, with one orbital fissure; anterolateral margin with three or four, small, blunt spines, excluding outer-orbital spine, last spine longest and placed at distal end of epibranchial region; branchial regions inflated; posterolateral margins convex. *Eocene–Oligocene*: USA (Oregon, Washington), Canada (British Columbia).—FIG. 9,5. **P. vulgaris* (RATHBUN), T134, Oligocene, Washington, scale bar, 1 cm (new).

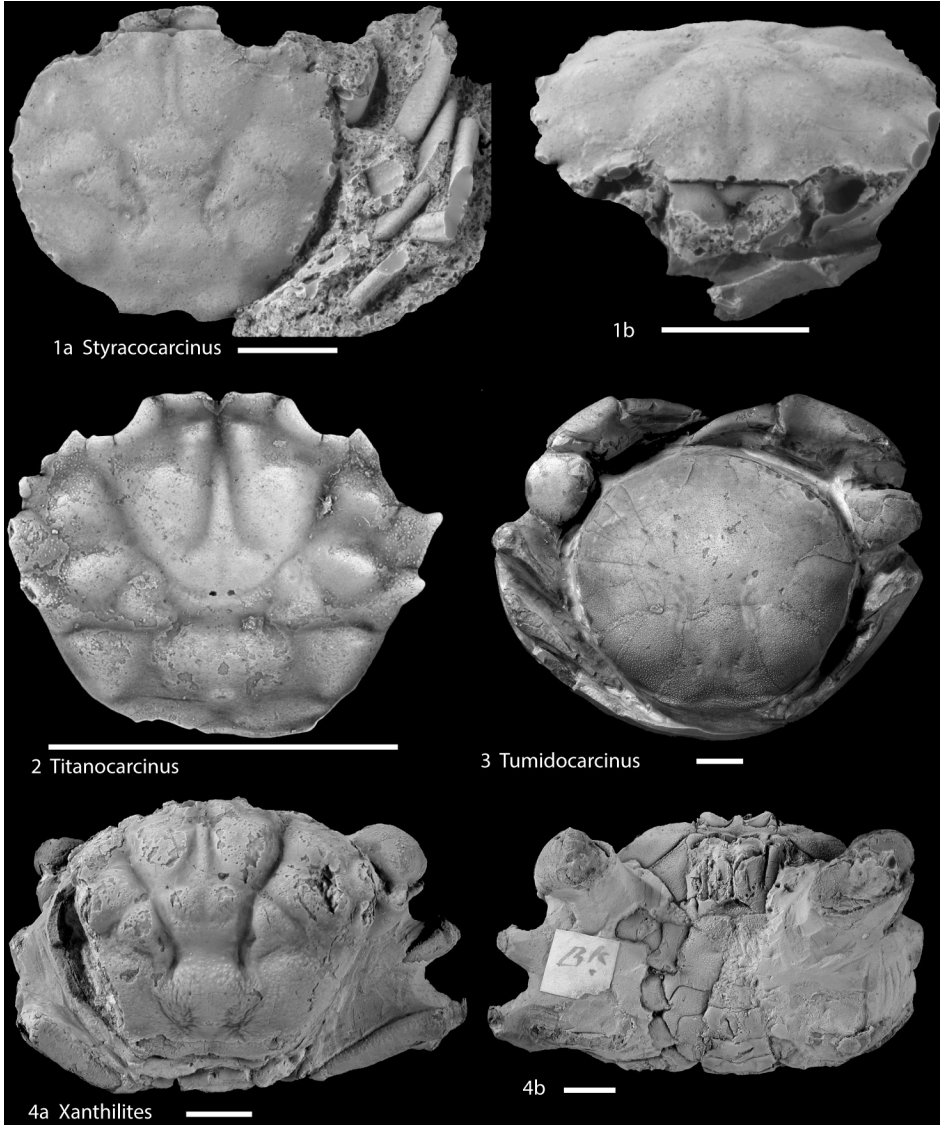


FIG. 10. Tumidocarcinidae (p. 15–16).

Styrocarcinus SCHWEITZER & FELDMANN, 2012, p. 23 [**Titanocarcinus meridionalis* SECRETAN, 1961, p. 41, pl. 1–3; M]. Carapace quadrate, length about 92 percent maximum width, widest about 44 percent the distance posteriorly on carapace at position of last anterolateral spine; front about 30 percent maximum carapace width; fronto-orbital width about 70 percent maximum carapace width; anterolateral margins with four spines including outer-orbital spines; posterolateral margin with two small spines; mesobranchial region broadly inflated, followed posteriorly by weak depression;

metabranchial region transversely inflated parallel to posterior margin; sternum with deep sternopleonal cavity extending anteriorly as axial groove onto sternites 3 and 4. [Emended from SCHWEITZER & FELDMANN, 2012, p. 23.] *Upper Cretaceous (Turonian–Maastrichtian)*: Morocco.—FIG. 10, 1a–b. **S. meridionalis* (SECRETAN), cast of holotype, MNHN A24595; a, dorsal carapace; b, anterior view, Turonian–Maastrichtian, Morocco, scale bars, 1 cm (new).

Titanocarcinus A. MILNE-EDWARDS, 1863, pl. 9, 3, 10, 4; 1864, p. 31 [**T. serratifrons*; SD GLAESSNER,

1929, p. 384 [= *Leptooides* COLLINS, FRAAYE, & JAGT, 1995, p. 203 (type, *Dromiopsis briarti* FORIR 1887, p. 49, pl. 2, 8–9, OD)]. Carapace wider than long, maximum carapace length about 80 to 85 percent maximum carapace width, widest at position of last anterolateral spine, about half the distance posteriorly on carapace; carapace regions well marked by deep grooves; regions granular; moderately vaulted longitudinally; frontal margin axially notched, granular, usually with blunt protuberances or spines on either side of notch and at inner orbital angles; frontal width about 30 percent maximum carapace width; orbits semicircular, with thick rim, two orbital fissures positioned near outer-orbital angle, and sometimes a spine between fissures; fronto-orbital width between two-thirds and three-quarters maximum carapace width; anterolateral margin with four spines, excluding outer-orbital spine, second and third spines generally largest, fourth often very reduced, spines well-separated from one another; posterolateral margin convex, as long as or shorter than anterolateral margin; posterior margin thickly rimmed; epigastric region well defined, inflated; protogastric regions very inflated, usually with longitudinal groove separating anterior portion into two lobes; anterior projection of mesogastric region smooth, extending to a point level with the epigastric regions; metagastric and urogastric regions not well differentiated, depressed; cardiac region inflated; hepatic regions inflated; intestinal region depressed; branchial regions subdivided into epi-, meso-, and metabranchial regions, epibranchial region particularly well defined and composed of an inner and outer lobe. [Emended from SCHWEITZER, ARTAL, & others, 2007, p. 281.] *Upper Cretaceous (Maastrichtian)–Eocene (Ypresian)*: Belgium, Madagascar, The Netherlands, *Maastrichtian*; Austria, Denmark, *Danian*; France, Hungary, Italy, Spain, *Eocene (Ypresian)*.—FIG. 10.2. *T. briarti* (FORIR, 1887), holotype, IRSNB MI 11011, Maastrichtian, The Netherlands, scale bar, 1 cm (Schweitzer, Artal, & others, 2007, fig. 2C).

Tumidocarcinus GLAESSNER, 1960, p. 24 [**Harpac-tocarcinus tumidus* WOODWARD, 1876, p. 51, pl. 7; OD]. Carapace not much wider than long, rounded, strongly convex longitudinally and transversely; front four-lobed, about 25 percent maximum carapace width; orbits small, without fissures; anterolateral margin thickened, entire or with three or four spines; posterolateral margin convex; regions poorly marked; chelae strongly heterochelous, large. *Eocene–Miocene*: New Zealand, *Eocene (Lutetian–Priabonian)–Oligocene (Chattian)*, *Miocene (Langbian–Serravallian)*; Australia, *Eocene–Miocene*.—FIG. 10.3. *T. giganteus* Glaessner, 1960, KSU 1092, Miocene, New Zealand, scale bar, 1 cm (new).

Xanthilites BELL, 1858, p. 17, pl. 2, 2–6 [**X. bowerbanki*; M] [= *Pseudेरiphia* REUSS, 1859, p. 54, pl. 18, 4–6 (type, *P. mccoysi*, M), obj.]. Carapace hexagonal, markedly vaulted longitudinally; front four-lobed, axial two lobes longer; regions very well-developed, protogastric regions elevated well

above mesogastric region, hepatic region inflated, epibranchial regions inflated; all regions granular; two fused orbital fissures; three anterolateral spines excluding outer-orbital spine, second largest; grooves very deep. *Eocene (Lutetian)*: Germany. *Eocene*: United Kingdom (England).—FIG. 10.4a–b. **X. bowerbanki*, CM 38700, Eocene, England; a, dorsal carapace; b, ventral surface, scale bars, 1 cm (Schweitzer, 2005, fig. 3, 3, 4).

Family ZANTHOPSIDAE Vía, 1959

[*nom. correct.* SCHWEITZER, 2003, p. 1116, *pro* Xanthopsinae Vía, 1959, p. 50] [= *Lovaracarcinidae* ŠTEVČIĆ, 2011, p. 128]

Carapace wider than long, maximum carapace length about 80 percent of maximum carapace width, widest about one-half to two-thirds of the distance posteriorly on carapace, ovate or circular in shape, may be ornamented with large swellings that are sometimes arranged on ridges, regions poorly or moderately defined; branchio-cardiac groove well developed; front with four, blunt spines including inner orbital spines, frontal width about one-quarter maximum carapace width; orbits circular or rectangular, entire, rimmed, fronto-orbital width about half maximum carapace width; anterolateral margin convex, entire, with three to five blunt spines or with numerous small spines; last anterolateral spine may extend onto carapace as long, low ridge; anterolateral margin often tightly arched posteriorly; anterolateral margin about as long or slightly longer than posterolateral margin; posterolateral margin sinuous or weakly concave; posterior margin nearly straight, 30 to 40 percent of maximum carapace width; sternum narrow, ovate, broadest anteriorly at position of fourth sternite, narrowing posteriorly; sternal suture 4/5 incomplete; sutures 5/6 to 7/8 complete; sutures 4/5 and 5/6 not parallel; sternite 4 in males and females with swelling just anterior to episternal projection of sternite 4; sternite 4 with clear longitudinal grooves near lateral margins that appear to be episternal projections of sternite 3 fused with sternite 4; sternite 8 not visible in ventral view; male pleon with somites 3–5 fused, suture between 4/5 visible; somite 3 with lateral extensions often ornamented with spherical swellings; telson

longer than somite 6; male pleon reaching base or middle of coxa of pereopod 1; male pleon covering entire space between coxae of pereopods 5; chelae large, subequal or weakly heterochelous, outer surface smooth or with large swellings, upper and lower margins with numerous small spines; chelipeds much longer than walking legs; ischium of major cheliped articulating with coxa, merus not fused completely to ischium. [Emended from KARASAWA & SCHWEITZER, 2006, p. 45.] *Paleocene–Miocene*.

Amekicarcinus SCHWEITZER, ODUMODU, & FELDMANN, 2016, p. 71, fig. 7 [**A. enigmaticus*; M]. Carapace wider than long, flattened; mesogastric region with long, narrow anterior process, posterior portion semicircular; remainder of axial regions narrow; epibranchial region arcuate; sternite 3 broadly inflated centrally, with deep, wide notch laterally between sternites 3 and 4 and groove on remainder of interface between sternites 3 and 4; sternite 4 with long, sharp swelling on episternite 3 and smaller swelling centrally; sternites 5–7 becoming less wide; sternite 8 probably not visible in ventral view; pleon appearing to have been quite narrow, somite 6 long. [SCHWEITZER, ODUMODU, & FELDMANN, 2016, p. 71.] *Eocene*: Nigeria.—FIG. 11, 1a–b. **A. enigmaticus*, holotype, CM 59126; a, partial dorsal carapace; b, reconstruction of carapace using mirror image of left side, scale bars, 1 cm (Schweitzer, Odumodu, & Feldmann, 2016, fig. 7A,C).

Fredericia COLLINS & JAKOBSEN, 2003, p. 75, p. 6, fig. 1–7 [*F. barsoei*; OD]. Carapace rounded, not much wider than long, regions poorly defined; front with four lobes including inner-orbital lobes, fronto-orbital width about 60 percent of maximum carapace width; anterolateral margins entire; regions poorly defined; male pleonal somites 3–5 fused. *Eocene (Ypresian–Lutetian)*: Denmark.—FIG. 11, 2a–b. **F. barsoei*, holotype MGUH 26798, *Ypresian–Lutetian*, Denmark; a, dorsal carapace; b, ventral surface, scale bars, 1 cm (new; photos by S. Jakobsen, Natural History Museum of Denmark, Copenhagen).

Harpactocarcinus A. MILNE-EDWARDS, 1862, p. 64 [**Cancer punctulatus* DESMAREST, 1817, p. 498; SD RATHBUN, 1928, p. 3]. Carapace wider than long, length about 80 percent of maximum width, regions poorly defined to undefined, surface punctate; branchiocardiac groove well defined along lateral margins of urogastric region; front width about 25 percent of maximum carapace width, front with 4 spines including inner-orbital spines; orbits shallow, circular or rectangular, fronto-orbital width about half maximum carapace width; anterolateral margins with eight to fifteen spines. *Eocene (Ypresian)–Miocene (Serravallian)*: Turkey, *Ypresian*; Albania, Croatia, France, Italy, Hungary, Slovakia,

Slovenia, Spain, Switzerland, *Lutetian–Priabonian*; Italy, Romania, Somalia, *Eocene*; Germany, ?*Oligocene*; Iran, *Miocene (Langbian–Serravallian)*.—FIG. 11, 3. *H. dalmatius* SCHWEITZER, SHIRK, & others, 2007, holotype, PS01-0803, *Eocene*, Croatia, scale bar, 1 cm (adapted from Schweitzer, Shirk, & others, 2007, fig. 5.1).

Harpactoxanthopsis VÍA, 1959, p. 54 [**Cancer quadrilobatus* DESMAREST, 1817, p. 499; OD]. Carapace ovate, length about 80 percent maximum width, narrowing markedly posteriorly; regions poorly defined, branchiocardiac groove well defined along lateral margins of urogastric region; front with four spines including inner-orbital spine; anterolateral margins with five spines including outer-orbital spine. *Eocene (Lutetian–Priabonian)*: Albania, Croatia, France, Germany, Italy, Hungary, Slovakia, Spain, *Lutetian–Bartonian*; UK (England), *Lutetian*; Russia, *Bartonian*; Hungary, *Priabonian*.—FIG. 11, 4a–b. **H. quadrilobatus* (DESMAREST), syntype, MNHN.F.R03824, *Eocene*, France; a, dorsal carapace; b, ventral surface, scale bars, 1 cm (new; Muséum national d'histoire naturelle, Paris, France, Collection: Paleontology (F), Fossil specimen MNHN.F.R03824, <http://coldb.mnhn.fr/catalognumber/mnhn/fr/r03824>, photo by Jocelyn Falconnet).

Lovaracarcinus DE ANGELI & BESCHIN, 2010, p. 30, pl. 1 [**L. granulatus*; OD]. Carapace ovate, length about 75 percent maximum width; strongly vaulted longitudinally; front very broadly quadrilobed, about 25 percent maximum carapace width; orbits rimmed; anterolateral margins with four, small spines, not including small outer-orbital projection, granular in between spines; posterolateral margins with two spines; posterior margin narrow; entire carapace surface coarsely granular. *Eocene (Lutetian)*: Italy.—FIG. 12, 1. **L. granulatus*, paratype, MCZ3220-I.G.336906, scale bar, 1 cm (new; photo by A. De Angeli, Associazione del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Martinetta BLOW & MANNING, 1997, p. 172, pl. 1, 1 [**M. palmeri*; OD]. Carapace wider than long, length about 70 percent maximum carapace width; front with four spines including inner-orbital spines, about 25 percent maximum carapace width; orbits small for family, rimmed, fronto-orbital width about 34 percent maximum carapace width; anterolateral margin long, with about fifteen spines, last longest; posterior width narrow; protogastric and mesogastric regions weakly inflated. *Eocene (Lutetian–Bartonian)*: USA (South Carolina).—FIG. 12, 2. **M. palmeri*, holotype USNM 496363, scale bar, 1 cm (new).

Neozanthopsis SCHWEITZER, 2003, p. 1119 [**Harpactocarcinus americanus* RATHBUN, 1928, p. 3, pl. 2, 3; OD]. Carapace ovate, length about 80 percent maximum width; front with four short spines including inner-orbital spines, about 30 percent maximum width; fronto-orbital width about half carapace width; anterolateral margin entire or with three or four blunt spines, last spine extending onto dorsal carapace as oblique ridge; carapace regions

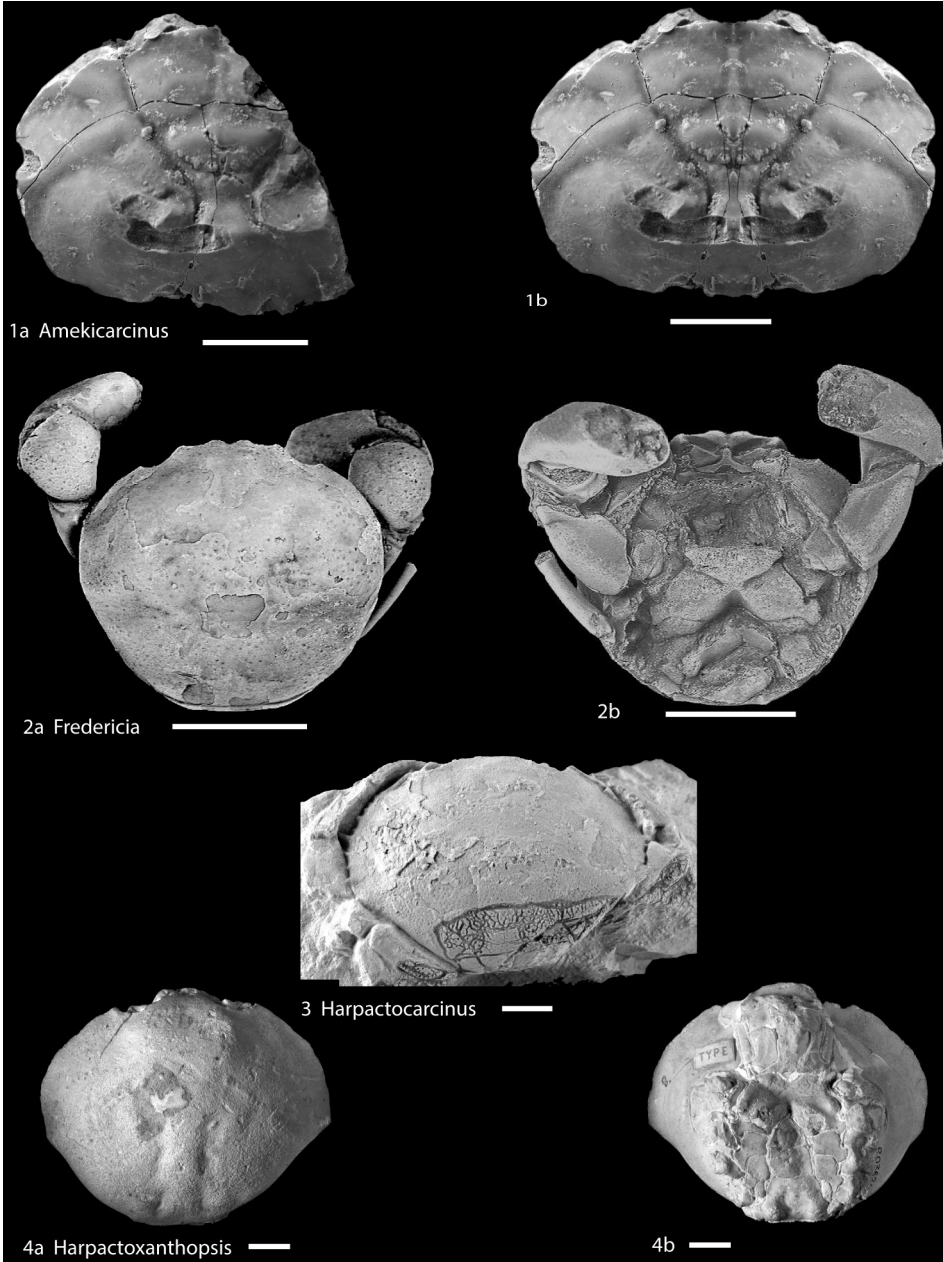


FIG. 11. Zanthopsidae (p. 17).

developed as broad swellings. *Eocene (Lutetian)*: Germany, Italy, Spain. *Eocene*: Armenia; Germany; Baja California, Mexico; Somalia; South Carolina, Texas, USA.—FIG. 12, 4*a*–*b*. **N. americanus* (RATHBUN), NLU2F-27, 4*a*, dorsal carapace; 4*b*, ventral surface, Eocene, South Carolina, scale bars,

1 cm (adapted from Schweitzer, Feldmann, & Stringer, 2014, pl. 1, 1–2). *Zanthopsis* M'COY, 1849, p. 162 [**Cancer leachii* DESMAREST, 1817, p. 500; OD] [= *Cycloxanthus* H. MILNE EDWARDS in D'ARCHIAC, 1850, p. 304k (type, *C. dufourii*; SD herein); = *Xanthopsis* M'COY

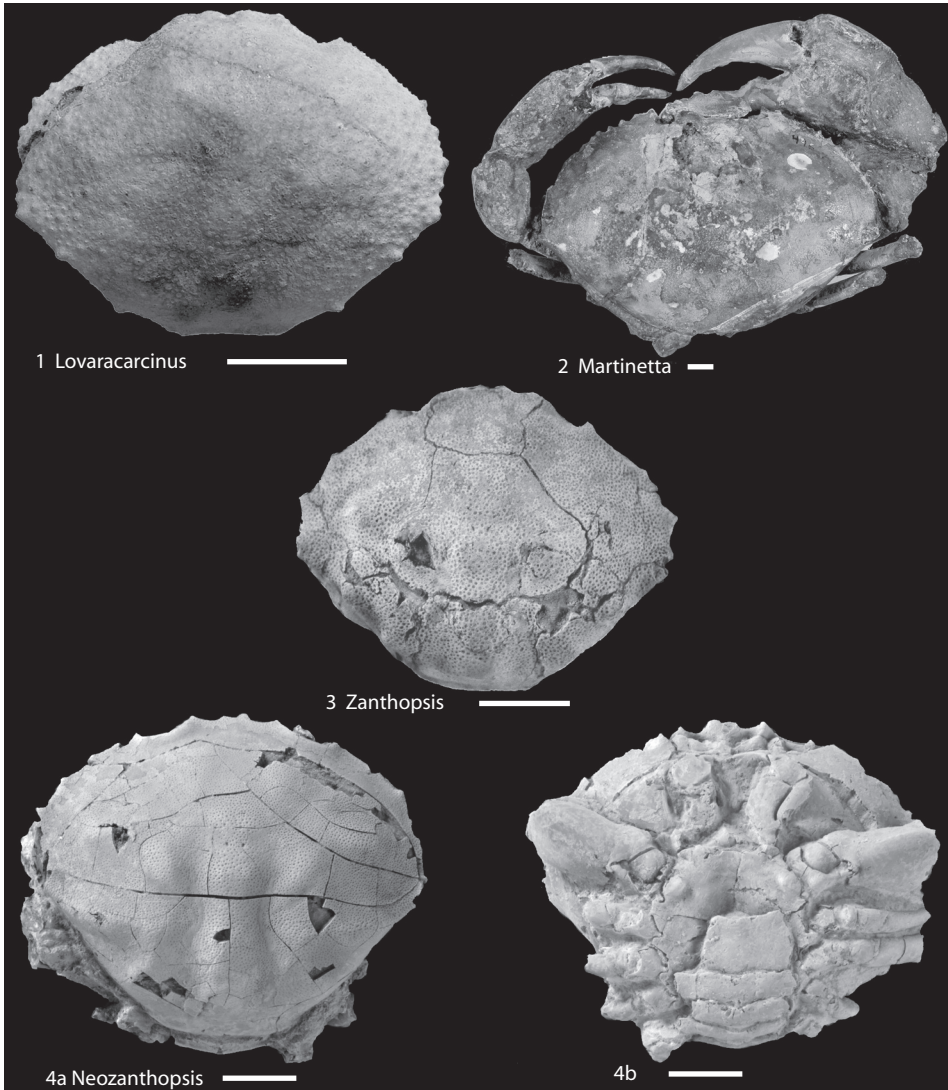


FIG. 12. Zanthopsidae (p. 17–19).

in BELL, 1858, p. 10 (type, *X. leachii*, OD)]. Carapace ovate, length about 80 percent maximum width; regions poorly to moderately defined; front with four, blunt spines including inner-orbital spines; orbits circular, entire, fronto-orbital width about half maximum carapace width; antero-lateral margins with four or five, blunt spines including outer-orbital spines; branchial regions with discrete swellings arranged into rows, rows may be situated on ridges; chelipeds large, heterochelous. *Paleocene* (*Selandian*)–*Oligocene* (*Rupelian*): France, *Selandian*; Belgium, France, Germany, UK (England), *Ypresian*; Belgium, France, Spain, Switzerland, Turkey, *Lutetian*; USA (New Jersey),

Lutetian–*Priabonian*; Iran?, Ivory Coast, Peru, USA (California, Texas), *Eocene*; Germany, *Rupelian*; USA (Oregon), *Oligocene*.—FIG. 12.3. **Z. leachii* (DESMAREST), CM 38715a, *Ypresian*, England, scale bar, 1 cm (Schweitzer, 2003, fig. 4,1).

ABBREVIATIONS FOR MUSEUM REPOSITORIES

BMFM: Bulletin of the Mizunami Fossil Museum,
Japan
BMNH: The Natural History Museum, London,
England, UK

- CM: Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA
- GHUNLPam: Geological Museum, Universidad Nacional de La Pampa, Santa Rosa, La Pampa, Argentina
- GSCM: Georgia Southern Museum, Georgia Southern University, Statesboro, Georgia, USA
- IRSNB: Institut Royal des Sciences Naturelles de Belgique, Mesozoic Invertebrates (Koninklijk Belgisch Instituut voor Natuurwetenschappen), Brussels, Belgium
- KSU D: Decapod Comparative Collection, Department of Geology, Kent State University, Kent, Ohio, USA
- MCV: Museo Civico “D. Dal Lago” di Valdarno, Vicenza, Italy
- MCZ: Museo Civico “G. Zannato” di Montecchio Maggiore, Vicenza, Italy
- MGB: Museu de Geologia de Barcelona, Spain
- MGUH: Geologisk Museum, University of Copenhagen, Denmark
- MNH.N.F: Muséum National d’histoire naturelle, Paris, Collection de Paléontologie, France
- NLU: University of Louisiana Museum of Natural History, Geosciences Division, University of Louisiana at Monroe, Louisiana, USA
- PS: Department of Geology and Paleontology, University of Zagreb, Croatia
- RGMN-T06: Biology Department, Faculdade de Filosofia, Ciências e Letras da Universidade de São Paulo, Brazil
- SMF: Senckenberg Forschungsinstitut und Naturmuseum, Department of Paleontology and Historical Geology, Frankfurt, Germany
- SMNS: Staatliches Museum für Naturkunde, Stuttgart, Germany
- T: Bruce Theil Collection, Portland, Oregon, USA
- UBIP: Institut für Paläontologie, Universität Bonn, Germany
- USNM: United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA
- UT: Texas Memorial Museum, Non-vertebrate Paleontology, Jackson School of Geosciences, The University of Texas at Austin, Texas, USA

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