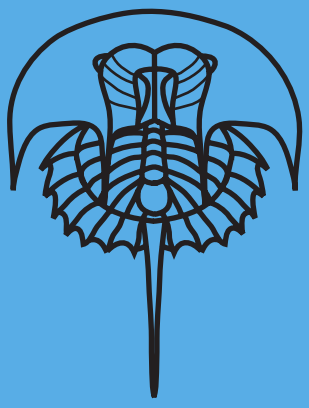

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## Part R, Revised, Volume 1, Chapter 8T22: Systematic Descriptions: Infraorder Anomura

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# PART R, REVISED, VOLUME 1, CHAPTER 8T22: SYSTEMATIC DESCRIPTIONS: INFRAORDER ANOMURA (exclusive of Lithodoidea, Lomisoidea, and Paguroidea)

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## Infraorder ANOMURA MacLeay, 1838

[Anomura MacLeay, 1838, p. 54; =Anomala Latreille, 1817, p. 358 (see summary of usage and spelling in McLaughlin & Holthuis, 1985)]

Carapace variable in shape, not fused to epistome, epistome protected by sides of carapace; eyes well developed, stalked; antennules with three-segmented peduncle, flagellae usually paired; antennal peduncle with 5 (sometimes 6) or fewer segments; maxillipeds usually pediform, crista dentate, usually present; first pereiopod usually chelate; second, third, and fourth pereiopod usually ambulatory but may be chelate; fifth pereiopod reduced, chelate or subchelate; eighth thoracic sternite loosely connected to seventh; pleopods usually weakly developed, commonly reduced or absent only on one side; pleon may be asymmetrical; uropods may be reduced or absent; telson may be composed of multiple plates, sometimes reduced or absent. [Emended from Tudge, Asakura, & Ahyong, 2012, p. 223.] *Upper Triassic* (*Norian–Rhaetian*)*–Holocene.*

## Superfamily AEGLOIDEA Dana, 1852

[*nom. transl.* McLaughlin, Lemaitre, & Sorhannus, 2007, p. 108, *ex* Aegleidea Dana, 1852, p. 475]

Diagnosis as for family. *Lower Cretaceous* (*Albian*)*–Holocene.*

### Family AEGLIDAE Dana, 1852

[*nom. correct*. Rathbun, 1910, p. 602, *pro* Aegleidea Dana, 1852, p. 475]

Carapace dorsoventrally flattened, cuneate, longer than wide, widest near posterolateral corners; dorsal carapace with *lineae* including *linea aeglica dorsalis* positioned in branchial region, *linea aeglica lateralis* paralleling posterolateral margin, transverse *branchial lineae*, and *lineae aeglicae ventrali* present; cervical groove deep; outer-orbital spines present, rostrum extending beyond orbital spines; anterolateral margin with strong anterior spine and smaller spines posterior to it; first pereiopods chelate, isochelous or subequal, inner margin of chela flabellate, inner margin of carpus spinose; pereiopods 2–4 similar in form; pereiopod 5 with tiny chela, usually carrying sternum within carapace; sternite 8 well developed or reduced; pleon with distinct somites, telson, and uropods present, telson usually divided by longitudinal suture. [Feldmann, 1984, p. 380; Martin & Abele, 1988, p. 5–30.] *Lower Cretaceous* (*Albian*)*–Holocene.*

**Aegla** Leach, 1820, p. 49 [**Galathea laevis* Latreille, 1818, pl. 308,*2;* M]. Carapace dorsoventrally flattened, cuneate, longer than wide, widest near posterolateral corners; dorsal carapace with *lineae* including *linea aeglica dorsalis* positioned in branchial region, *linea aeglica lateralis* paralleling posterolateral margin, transverse *branchial lineae*, and *lineae aeglicae ventrali* present; cervical



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groove deep; outer-orbital spines present, rostrum extending beyond orbital spines; anterolateral margin with strong anterior spine and smaller spines posterior to it; first pereiopods chelate, isochelous or subequal, inner margin of carpus spinose; pereiopods 2–4 similar in form; pereiopod 5 with tiny chela, usually carried under or within carapace; sternite 8 well developed or reduced; pleon with distinct somites, telson, and uropods present, telson usually divided by longitudinal suture. [Emended from Feldmann, 1984; Martin & Abele, 1988; Bond-Buckup & Buckup, 1994, p. 169.] *Holocene:* Argentina, Brazil, Chile, Paraguay, Uruguay.——Fig. 1,*1. A. platensis* Schmitt, 1942, Holocene, Uruguay, KSU D 1077, scale bar 1 cm (new).

**Haumuriaegla** Feldmann, 1984, p. 380 [**H. glaessneri,* p. 380, fig. 1–5; OD]. Carapace triangular, longer than wide, strongly vaulted transversely; orbits circular, rimmed; cervical groove deep, arcing convex forward laterally, then curving strongly concave forward across axis; tiny spine on lateral margin just posterior to intersection of cervical groove with lateral margin; weak branchiocardiac grooves define cardiac region; entire carapace covered with dense, scabrous ornamentation; posterior margin concave, widely rimmed. *Upper Cretaceous* (*Maastrichtian*): New Zealand (South Island).——Fig. 1,*2*. **H. glaessneri,* holotype, NZGS AR 915, scale bar 1 cm (new).

**Protaegla** Feldmann, Vega, Applegate, & Bishop, 1998, p. 86 [**P. miniscula,* p. 86, fig. 6; OD]. Carapace triangular, approximately as wide as long; sternum triangular, with nodes on posterolateral corners of somites; chelipeds short, claws subequal, rounded, inner surface flabellate; pereiopods 2–4 approximately equal in size. *Lower Cretaceous* (*Albian*): Mexico (Puebla).——Fig. 1,*3*. **P. miniscula,* holotype, IGM-6502, scale bar 1 cm (new, photo by F. Vega, Universidad Nacional Autonoma de Mexico, Ciudad de México, Mexico).

## Superfamily CHIROSTYLOIDEA Ortmann, 1892

[*nom. transl.* Schnabel & Ahyong, 2010, p. 57, *ex* Chirostylidae Ortmann, 1892, p. 244]

Carapace symmetrical, with or without transverse striae; rostrum variously developed, usually prominent; supraocular spines present or absent; sternum consisting of sternites 3–7, thoracic somite 8 without sternal plate; pleon well developed, all somites sclerotized, articulating; tailfan well developed, folded against preceding somite; telson transversely divided by suture; antennal peduncle consisting of 5 articles; mandible with toothed cutting edge; pereiopod 1 chelate, pereiopods 2–4 as walking legs [Emended from Schnabel & Ahyong, 2010, p. 57.] *Upper Cretaceous* (*Campanian–Maastrichtian*)*–Holocene.*

### Family CHIROSTYLIDAE Ortmann, 1892

[Chirostylidae Ortmann, 1892, p. 244; =Diptycinae Bouvier, 1896, p. 312; =Uroptychidae Alcock, 1901, p. 236]

Carapace smooth or with tubercles or spines, without transverse striae, maximum width approximately three-quarters the distance posteriorly on carapace, regions usually poorly defined; frontal area narrow, diverges rapidly posteriorly, supraocular spines absent; branchial regions separated axially by cardiac and intestinal regions; anterior margin of sternite 3 not strongly produced anteriorly; pleuron of second pleonal somite without spine on anterolateral margin; antennal peduncle with five segments. [Emended from Tudge, Asakura, & Ahyong, 2012, p. 309.] *Eocene* (*Ypresian)–Holocene.*

**Chirostylus** Ortmann, 1892, p. 246 [**C. dolichopus,* p. 246, pl. 11,*2, 2b, 2c, 2e, 2i, 2o, 2z;* M]. Carapace overall trapezoidal; smooth or with spines, two epigastric spines present; posterolateral reentrants deep; rostrum short at base, may have median spine; anterior margin of sternum straight or concave, with row of spines; pleon unornamented, somites smooth; pereiopods 1–4 very long, slender. [Emended from Baba & others, 2009, p. 8.] *Holocene:* Indo-Pacific Ocean.——Fig. 1,*4*. **C. dolichopus,* USNM 128562, Holocene, Japan, scale bar 5 mm (new).

**Eouroptychus** De Angeli & Ceccon, 2012, p. 20 [**E. montemagrensis,* p. 22, fig. 2; OD]. Carapace longer than wide, cuneate, widest ~75% the distance posteriorly; rostrum long, wide at base, with one lateral spine; orbits at base of rostrum, forward directed; lateral margins with tiny spines along ~80% the distance posteriorly; carapace with distinct swellings on mesogastric, cardiac, branchial, and intestinal regions. *Eocene* (*Ypresian*): Italy.——Fig. 1,*6*. **E. montemagrensis,* holotype, MCV 11/08-I.G. 327473, scale bar 1 mm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Phalangiopsis** Charbonnier, Audo, Garassino, & Hyžný, 2017, p. 174 [**P. rogeri;* OD]. Carapace elongate, with transverse ridges; rostrum spinelike; antennae long; third maxillipeds long; pereiopods 1–4 very long, slender, with multiple rows of spines along entire length. [Emended from Charbonnier & others, 2017, p. 174.] *Upper Cretaceous* (*Cenomanian, Santonian*): Lebanon.——Fig. 1,*6*.

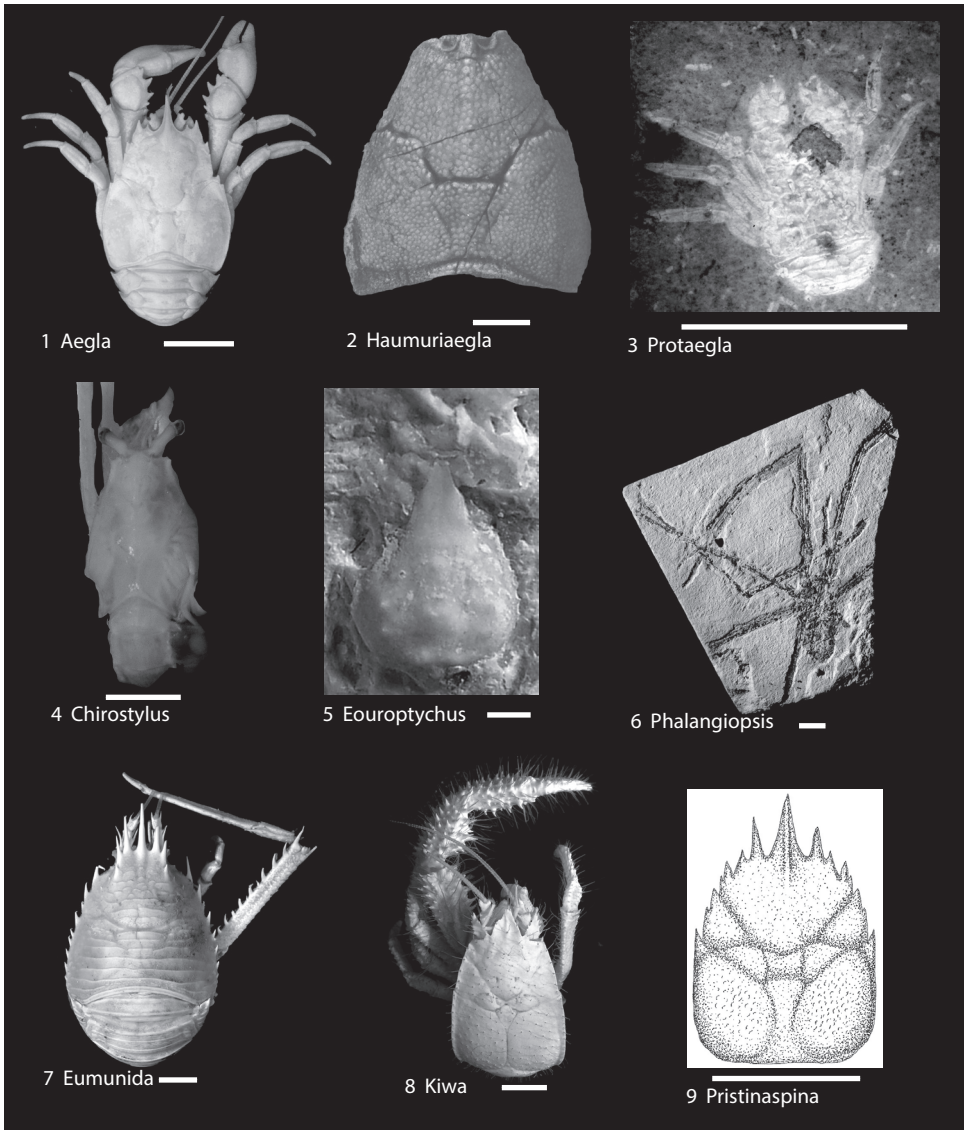


FIG 1. Aeglidae, Chirostylidae, Eumunididae, Kiwaidae, Pristinaspinidae (p. 1–4).

**P. rogeri*, holotype, MNHN.F.A.30771, Cenomanian, Lebanon, scale bar 1 cm (photo by D. Audo, Project Recolnat, MNHN).

## Family EUMUNIDIDAE A. Milne-Edwards & Bouvier, 1900

[*nom correct*. SCHNABEL & AHYONG, 2010, p. 58, *pro* Eumunidae A. MILNE-EDWARDS & BOUVIER, 1900, p. 364]

Carapace cordate, elongate, with transverse setiferous striae; posterolateral margin entire; rostrum styliform; one or two pairs of supraocular spines; cervical groove distinct; branchial regions separated axially by cardiac and intestinal regions; anterior margin of sternite 3 sinuous or irregular, not strongly produced anteriorly; pleuron of second pleonal somite with spine on anterolateral margin. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 310.] *Holocene*.

**Eumunida** SMITH, 1883, p. 44 [**E. picta,* p. 44, pl. 2,*2,* pl. 3,*6–10,* pl. 4,*1–3;* M]. Carapace narrowed

anteriorly and widened distally, ornamented with well-developed transverse ridges; rostrum long, needlelike; two pairs supraocular spines; cervical groove well developed, semicircular; lateral margins with numerous small spines. *Holocene:* Atlantic Ocean, Indo-Pacific Ocean.——Fig. 1,*7.* **E. picta,* USNM 1188889, Holocene, Caribbean Sea, scale bar 1 cm (new).

### Family KIWAIDAE Macpherson, Jones, & Segonzac, 2005

[Kiwaidae Macpherson, Jones, & Segonzac, 2005, p. 712]

Carapace elongate, smooth, without transverse striae; posterolateral margin entire; rostrum triangular; one pair supraocular spines; cervical groove distinct; branchial regions meeting axially; anterior margin of sternite 3 strongly produced anteriorly; pleuron of second pleonal somite without spine on anterolateral margin; eyes very reduced, uncalcified. [Emended from Tudge, Asakura, & Ahyong, 2012, p. 310.] *Holocene*.

**Kiwa** Macpherson, Jones, & Segonzac, 2005, p. 713 [**K. hirsuta,* p. 713, fig. 3–8; OD]. Characters as for family. *Holocene:* East Pacific Ocean, Indian Ocean.——Fig. 1,*8. K. puravida* Thurber, Jones, & Schnabel, 2011, USNM 1160379, *Holocene*, Costa Rica, scale bar 1 cm (new).

### Family PRISTINASPINIDAE Ahyong & Roterman, 2014

[Pristinaspinidae Ahyong & Roterman, 2014, p. 126]

Carapace elongate, widening posteriorly; ornamented with dimples or pits, without transverse striae or spines; region clearly defined; rostrum triangular, axially carinate; one pair supraorbital spines; anterolateral margins with five spines; one posterolateral spine; cervical and branchiocardiac grooves deep; branchial regions separated by fused cardiac and intestinal regions. [Emended from Ahyong & Roterman, 2014, p. 126.] *Upper Cretaceous* (*Campanian–Maastrichtian*).

**Pristinaspina** Schweitzer & Feldmann, 2000, p. 159 [**P. gelasina,* p. 160, fig. 8–9; OD]. Carapace longer than wide, widest approximately two-thirds the distance posteriorly, surface dimpled; rostrum long, axially keeled; supraocular spines long, narrower than rostrum; lateral margins with six forward-directed spines; carapace regions well defined by cervical, branchiocardiac, and postcervical grooves. [Emended from Schweitzer & Feldmann, 2000, p. 160.] *Upper Cretaceous* (*Campanian–Maastrichtian*): USA (Alaska).——Fig. 1,*9. **P. gelasina,* holotype, UAM 2571, scale bar 1 cm (Schweitzer & Feldmann, 2000, fig. 9).

## Superfamily EOCARCINOIDEA Withers, 1932

[*nom. transl.* Feldmann & Schweitzer, 2010, *ex* Eocarcinidae Withers, 1932, p. 315]

Carapace elongate, lacking true orbits; cervical groove and gastro-orbital, and branchiocardiac grooves; well-developed pleon carried posteriorly extended, with well-developed articulating rings; first pereiopods carried parallel to carapace, at least one of pereiopods 2–5 chelate. *Upper Triassic* (*Norian–Rhaetian*)*–Lower Jurassic* (*Pliensbachian*).

### Family EOCARCINIDAE Withers, 1932

[Eocarcinidae Withers, 1932, p. 315]

Diagnosis as for genus.

**Eocarcinus** Withers, 1932, p. 315 [**E. praecursor,* p. 315, pl. 9,*1–5,* pl. 10,*1;* M]. Carapace elongate, deltoid; rostrum small, triangular, frontal margin composed of two concave arcs; cervical, gastro-orbital, postcervical, and branchiocardiac grooves deep, subparallel; pleonal somites well developed, wide, with wide articulating rings, pleon appearing to curve ventrally at approximately position of somite 5; first pereiopod large, strongly chelate; second or third pereiopod chelate. *Lower Jurassic* (*Pliensbachian*): UK (England).——Fig. 2,*1. **E. praecursor,* holotype, NHMUK In. 18425, scale bar 1 cm (new).

### Family PLATYKOTTIDAE Chablais, Feldmann, & Schweitzer, 2011

[Platykottidae Chablais, Feldmann, & Schweitzer, 2011, p. 98]

Cephalic region bearing prominent spines; epigastric region elevated slightly above remainder of cephalic region, flattened, and defined by finely spinose rim; carapace granular; pleonal somites with smooth, axially keeled tergum and granular pleura; sternum triangular, sternites increasingly wide posteriorly; coxae of pereiopods decreasing in size posteriorly; mandibles stout, heavily calcified; third maxillipeds long, pediform. [Emended from Chablais, Feldmann, & Schweitzer, 2011, p. 98.] *Upper Triassic* (*Norian–Rhaetian*).

**Platykotta** Chablais, Feldmann, & Schweitzer, 2011, p. 99 [**P. akaina,* p. 99, fig. 3–4; OD]. Carapace in dorsal view, bearing two deep transverse grooves; anterior with prominent rostrum and several strong spines; metagastric region elevated, flattened, rimmed by small spines; entire surface granular; pleonal somites 1 and 2 smooth axially, granular laterally; pereiopods generally slender and granular; sternum triangular, broad posteriorly, with paired pits on each sternite; coxae of pereiopods decreasing in size posteriorly; mandibles stout, heavily calcified; third maxillipeds long, pediform. [Emended from Chablais, Feldmann & Schweitzer, 2011, p. 99.] *Upper Triassic* (*Norian–Rhaetian*): United Arab Emirates.——Fig. 2,*2*. **P. akaina,* holotype, MHNG GEPI 78420, scale bar 1 cm (Chablais, Feldmann & Schweitzer, 2011, fig. 3b, see this figure for abbreviations).

## Superfamily GALATHEOIDEA Samouelle, 1819

[*nom. transl.* Henderson, 1888, p. 115, *ex* Galatheidae Samouelle, 1819, p. 92]

Carapace generally longer than wide, sometimes as long as wide; rostrum usually well developed; carapace with transverse ridges, tubercles, or granules; cervical groove well-defined; pleon symmetrical, all somites freely articulating; sternum with 8 somites; pereiopod 1 chelate; telson subdivided into plates. [Emended from Ahyong & others, 2010, p. 58.] *Middle Jurassic* (*Bathonian*)–*Holocene*.

**Ovocarcinus** Müller & Collins, 1991, p. 60 [**O. elongatus,* p. 60, pl. 2,*9–11;* OD]. Carapace longitudinally ovate, smooth; rostrum spatulate, strongly downturned; orbits circular, forward directed, placed at base of rostrum. *Eocene* (*Priabonian*): Hungary.——Fig. 2,*3*. **O. elongatus,* scale bar 1 mm (new, drawing based on Muller & Collins, 1991, pl. 2,*10*).

### Family CATILLOGALATHEIDAE Robins, Feldmann, Schweitzer, & Bonde, 2016

[Catillogalatheidae Robins, Feldmann, Schweitzer, & Bonde, 2016, p. 98]

Carapace longer than wide; moderately convex transversely; rostrum triangular, rectangular, or spatulate in shape, medially marked with groove or keel; epigastric region markedly elevated above rostrum; rostrum bordering epigastric region anteriorly and laterally; gastro-orbital groove extremely strong, separating epigastric region from rostrum and extends posterolaterally from orbital area; cervical groove deeply incised; mesogastric region well defined; ornamentation usually consisting of tubercles or short, squamous ridges. [Emended from Robins & others, 2016, p. 99.] *Upper Jurassic* (*Oxfordian*)–*Upper Cretaceous* (*Cenomanian–Turonian*).

**Catillogalathea** Robins, Feldmann, Schweitzer & Bonde, 2016, p. 100 [**C. falcula,* p. 101, fig. 11.1–11.2; OD]. Carapace moderately convex; subrectangular in shape; rostrum broadly triangular; cervical groove well defined; gastro-orbital grooves strong; epigastric region well defined, separated from protogastric region by gastro-orbital groove, extending posterolaterally from orbital area; epigastric area raised above rostrum; urogastric and cardiac regions weakly defined; carapace, including rostrum, ornamented with squamous tubercles or ridges. [Emended from Robins & others, 2016, p. 100.] *Upper Jurassic* (*Kimmeridgian*): Germany. *Upper Jurassic* (*Tithonian*): Austria, Romania.——Fig. 2,*4*. **C. falcula,* holotype, NHMW 2007z0149/0435a, Tithonian, Austria, scale bar 5 mm (new).

**Annieporcellana** Fraaije, Van Bakel, Jagt, & Artal, 2008, p. 198 [**A. dhondtae,* p. 198, pl. 2,*5;* OD]. Carapace ovate; rostrum long, axially sulcate; epigastric regions inflated; lateral margins serrate; cervical and branchiocardiac grooves deep; mesogastric region well defined; branchial regions with short transverse ridges laterally. *Lower Cretaceous* (*Albian*): Spain.——Fig. 2,*5*. **A. dhondtae,* holotype, IRScNB MI 11054, scale bar 5 mm (new; photo by B. W. M. Van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

**Galatheites** Balss, 1913, p. 158 [**Galathea zitteli* Moericke, 1889, p. 52, pl. 6,*6;* SD Glaessner, 1929, p. 174]. Rostrum subrectangular, keel or medial rostral marking usually present; cardiac region weakly defined; ornamentation consisting of transverse, squamous ridges or squamous tubercles. [Emended from Robins & others, 2016, p. 104.] *Upper Jurassic–Lower Cretaceous*. *Upper Jurassic* (*Tithonian*): Austria, Czech Republic, Poland, Romania. *Lower Cretaceous* (*Albian*): Spain.——Fig. 2,*6*. **G. zitteli* (Moericke), lectotype, BSP ASIII308, Tithonian, Poland, scale bar 2 mm (new).

**Hispanigalathea** Klompmaker, Feldmann, Robins, & Schweitzer, 2012, p. 138 [**H. pseudolaevis,* p. 139, fig. 9; OD]. Carapace, excluding rostrum, longer than wide, moderately to strongly vaulted transversely, weakly vaulted longitudinally; rostrum broad at base, subtriangular with rounded tip, margins and tip bearing small spines; orbits small, forward directed; supraorbital margin with spine at outer orbital corner; lateral carapace margins parallel; epigastric regions raised; mesogastric

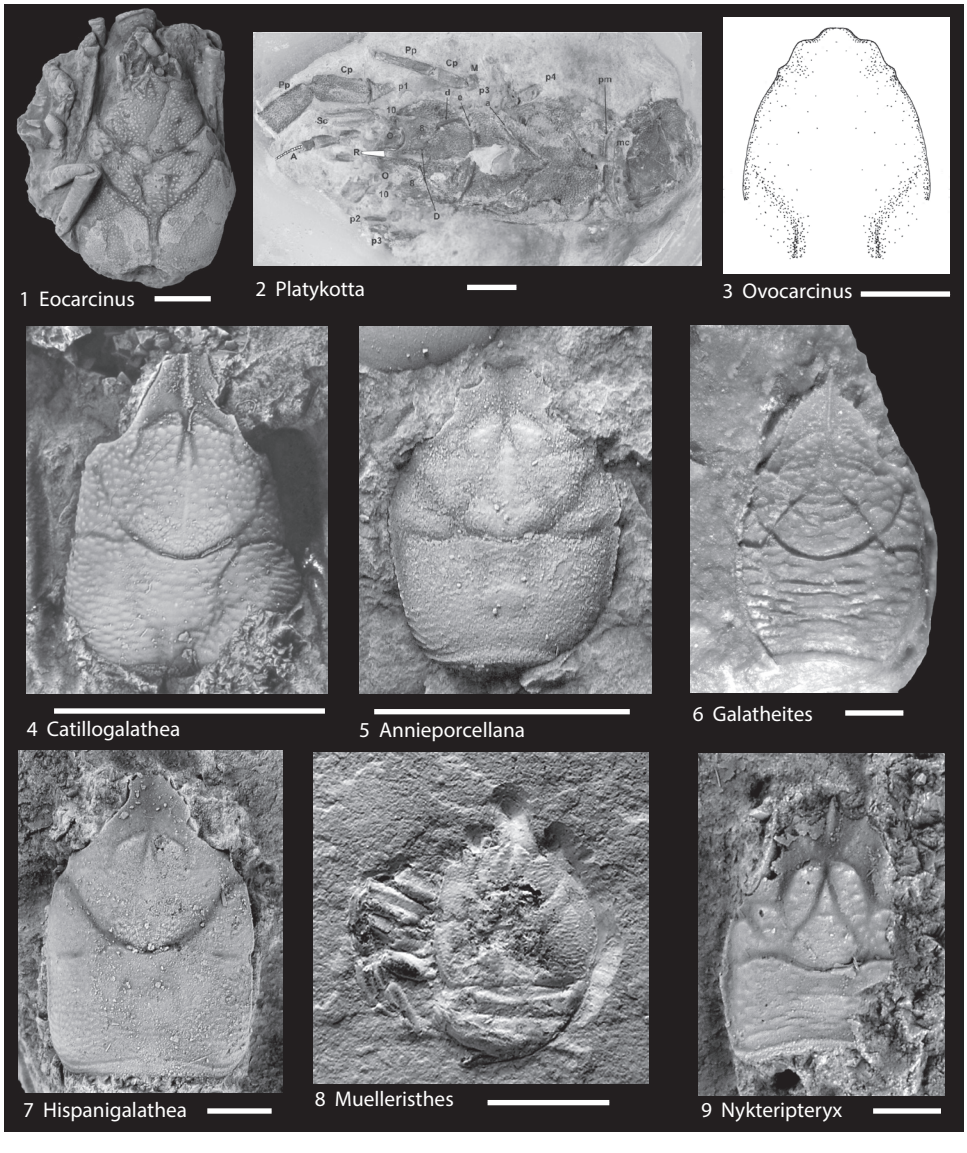


Fig 2. Eocarcinidae, Platykottidae, Galatheoidea, Catillogalatheidae (p. 4–7).

region well delimited posteriorly by cervical groove and anteriorly at tip, not delimited in middle portion; cardiac region weakly defined, approximately as long as wide; deep cervical groove concave forward, with anterior and posterior branch; carapace covered with granules or tubercles that appear transversely elongated in posterior part carapace. [Emended from Klompmaker & others, 2012, p. 138.] *Upper Jurassic–Lower Cretaceous. Upper Jurassic* (*Tithonian*): Austria. *Lower Cretaceous* (*Albian*): UK (England), Spain, USA (Texas).—— Fig. 2,*7*. **H. pseudolaevis,* holotype, MGSB 11118, Albian, Spain, scale bar 1 mm (new).

**Muelleristhes** Garassino, De Angeli, & Pasini, 2014, p. 119 [**Paragalathea africana* Garassino, De Angeli, & Pasini, 2008, p. 55, fig. 14; OD]. Carapace wider than long (excluding rostrum), convex transversely, wider posteriorly; broadly convex lateral margins; wide, weakly concave posterior margin; rostrum wide; dorsal regions weakly marked; cervical groove present; well-raised epigastric regions; dorsal surface of carapace with small tubercles and striations aligned transversely; pereiopods 2–4 robust, ending in lanceolate dactyli. [Emended from Garassino, De Angeli, & Pasini, 2014, p. 119.] *Upper Cretaceous* (*Cenomanian–*

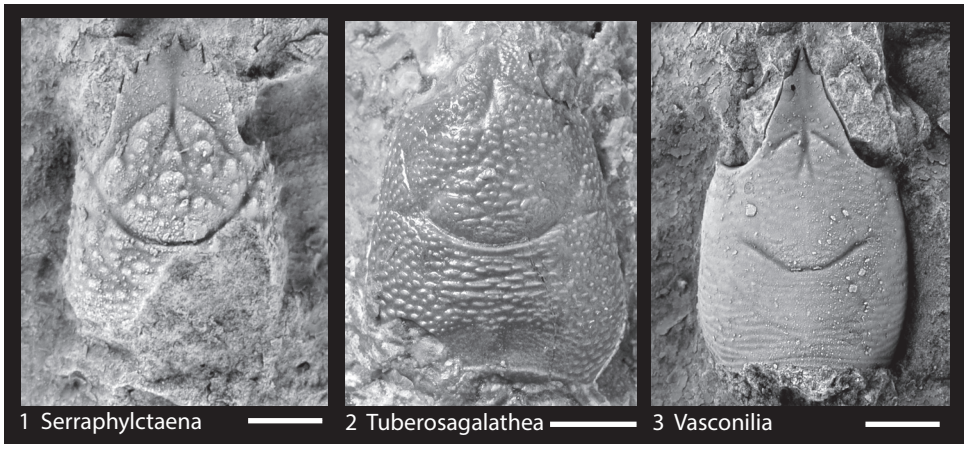


Fig 3. Catillogalatheidae (p. 7–8).

*Turonian*): Morocco.——Fig. 2,*8*. **M. Africana* (Garassino, De Angeli, & Pasini), holotype, MSNM i26863, scale bar 5 mm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Nykteripteryx** Klompmaker, Feldmann, Robins, & Schweitzer, 2012, p. 141 [**N. rostrata,* p. 142, fig. 11; OD]. Carapace wider than long excluding rostrum, longer than wide including rostrum, widest at midlength (not including rostrum); rostrum broad at base, subtriangular in general outline, with axial ridge on anterior part of rostrum extending into tip of rostrum, two anterolaterally directed smaller ridges adjacent to axial ridge, most visible anteriorly and protruding at margins of rostrum; lateral margins distinctly rimmed, weakly concave; large epigastric regions strongly raised, elongated longitudinally; strong cervical groove concave forward axially, sinuous, with strong, approximately transversely oriented posterior branch, anterior branch anterolaterally directed and weakly connected to central part of cervical groove; carapace anteriorly ornamented with tubercles, posteriorly with transverse striae. [Emended from Klompmaker & others, 2012, p. 141.] *Lower Cretaceous* (*Albian*): Spain.——Fig. 2,*9*. **N. rostrata,* holotype, MGSB 77719, scale bar 1 mm (new).

**Serraphylctaena** Robins, Feldmann, Schweitzer, & Bonde, 2016, p. 124 [**Paragalathea multisquamata* Via Boada, 1981, p. 248, fig. 3; OD]. Carapace, excluding rostrum, slightly longer than wide; rostrum broad at base, rounded to triangular in outline, margins bearing forward-directed spines that diminish in size posteriorly, median groove weakening toward tip; lateral carapace margins with tiny, forward directed spines; epigastric regions raised and relatively narrow; deep cervical groove broadly concave forward, with two branches laterally on carapace; carapace, except rostrum, ornamented with rounded tubercles, seemingly more elongated transversely around cardiac region [Emended from Klompmaker & others, 2012, p. 134.] *Lower Cretaceous* (*Albian*): Spain.——Fig. 3,*1*. **S. multisquamata,* MAB k2977, scale bar 1 mm (new).

**Tuberosagalathea** Robins, Feldmann, Schweitzer, & Bonde, 2016, p. 113 [**Galathea neojurensis* Patrulius, 1959, p. 252; OD; *nomen novum pro Galathea antiqua* Moericke, 1889, p. 54, pl. 6,*4, non Galathea antiqua* Risso, 1816, p. 73]. Carapace moderately convex, widening posteriorly; rostrum subtriangular to spatulate, with or without median keel; epigastric region very well-defined; cardiac region moderately defined; carapace, including rostrum, ornamented with transversely elongate tubercles or flexuous transverse ridges; intestinal region depressed; ornamented with setal pits. [Emended from Robins & others, 2016, p. 114.] *Upper Jurassic–Lower Cretaceous. Upper Jurassic* (*Oxfordian*): Czech Republic. *Upper Jurassic* (*Tithonian*): Austria, Czech Republic, Romania, UK (England). *Lower Cretaceous* (*Hauterivian*): France.——Fig. 3,*2*. **T. neojurensis,* lectotype BSP ASIII 323, Tithonian, Czech Republic, scale bar 5 mm (new).

**Vasconilia** Robins, Feldmann, Schweitzer, & Bonde, 2016, p. 122 [**Galathea ruizi* Van Straelen, 1940, p. 1, pl. 1,*1–2;* OD]. Dorsal carapace subrectangular; U-shaped cervical groove deep at base; weakening anteriorly; rostrum triangular; typically tridentate; epigastric region moderately defined; cardiac region weakly to moderately defined; posterior margin clearly rimmed; carapace ornamentation consisting of tubercles, transversely elongate tubercles, or weak ridges. [Emended from Robins & others, 2016, p. 122.] *Upper Jurassic–Lower Cretaceous. Upper Jurassic* (*Tithonian*): Austria. *Lower Cretaceous* (*Barremian*): Mexico. *Lower Cretaceous* (*Aptian*): ?Japan. *Lower Cretaceous* (*Albian*): Spain.——Fig. 3,*3*. **V. ruizi* (Van Straelen), MAB k2972, Albian, Spain, scale bar 1 mm (new).

## Family GALATHEIDAE Samouelle, 1819

[*nom. correct.* White, 1847, p. 65, *pro* Galateadae Samouelle, 1819, p. 92]

Carapace longer than wide or sometimes as long as wide, with or without transverse ornamentation, commonly with anterior gastric spines or other spinose or nodose ornamentation on dorsal carapace; rostrum well developed, wide, triangular, flattened, may be ornamented with small spines or serrations; typically, one or more pairs of supraocular spines; cervical and branchiocardiac grooves always present, frequently deep and well developed; lateral margins crenulate or ornamented with spines. ?*Upper Jurassic–Holocene*.

**Galathea** Fabricius, 1793, p. 471 [**Cancer strigosus* Linnaeus, 1761, p. 495; SD Latreille, 1810, p. 422; =*Galathea spinigera* Leach, 1815, in 1815–1875, pl. 28B]. Carapace with well-developed transverse ridges, lacking supraocular spines; rostrum spatulate, serrate or spinose, without median ridge; carapace regions poorly defined; cervical groove well developed. *Upper Jurassic–Holocene.* ?*Upper Jurassic* (*Tithonian*): Austria. ?*Lower Cretaceous* (*Albian*): USA (Texas). *Upper Cretaceous* (*Cenomanian–Turonian*): Morocco. *Paleocene* (*Danian*): Denmark, Germany (*ex situ*), Greenland, Sweden. *Eocene* (*Ypresian, Lutetian, Priabonian*): Italy. *Oligocene* (*Rupelian*): Italy. *Miocene* (*Serravallian*): Ukraine. *Miocene:* Austria, France, Greece, Hungary, Italy, Japan, Malta, Poland, Spain. *Pliocene:* Belgium, Italy, Spain. *Pleistocene:* Italy, Japan. *Holocene:* Cosmopolitan.——Fig. 4,*1. G. strigosa,* USNM 1188856, Holocene, Mediterranean Sea, scale bar 1 cm (new).

**Acanthogalathea** Müller & Collins, 1991, p. 56 [**A. parva,* p. 56, pl. 2,*3;* OD]. Carapace approximately as long as wide; rostrum axially sulcate, with spines at base; carapace with transverse ridges; cervical groove deep; three spines on epibranchial region; two spines on cardiac region; one spine on mesogastric region; lateral margins with at least five spines. *Eocene. Eocene* (*Pariabonian–Ypresian*): Italy. *Eocene* (*Priabonian*): Hungary, Italy.——Fig. 4,*2.* **A. parva,* KSU 1086, cast of MCZ 2175, Eocene, Italy, scale bar 5 mm (new).

**Bolcagalathea** Beschin, Busulini, Tessier, & Zorzin, 2016, p. 29 [**B. corallina,* p. 29, pl. 1,*6,* pl. 2,*1;* OD]. Carapace longer than wide, ornamented with transverse ridges; circumgastric groove deep; rostrum with three acuminate spines, axially sulcate, slightly downturned; lateral margins with several spines. *Eocene* (*Ypresian*): Italy.——Fig. 4,*3.* **B. corallina,* holotype, VR 93823, scale bar 5 mm (new, photo by R. Zorzin, Museo Civico di Storia Naturale di Verona, Italy).

**Eomunidopsis** Vía Boada, 1981, p. 249 [**Galathea orobensis* Ruiz de Gaona, 1943, p. 426, pl. 28,*2;* OD]. Carapace rectangular, longer than wide; rostrum triangular, sulcate; cervical groove deep; epigastric regions well defined; metagastric region wide, cardiac region strongly inflated; hepatic, epibranchial, and metabranchial regions ornamented with large tubercles; remainder of regions with transverse ridges that may themselves bear small tubercles. *Lower Cretaceous–Eocene. Lower Cretaceous* (*Barremian*): Japan, Mexico. *Lower Cretaceous* (*Albian*): Spain, USA (Texas). *Upper Cretaceous* (*Santonian*): Japan. *Upper Cretaceous* (*Maastrichtian*): The Netherlands. *Eocene* (*Ypresian*): Italy.——Fig. 4,*4.* **E. orobensis* (Ruiz de Gaona), MAB k2932, Albian, Spain, scale bar 5 mm (new).

**Eosadayoshia** Beschin, Busulini, Tessier, & Zorzin, 2016, p. 35 [**E. bolcensis,* p. 35, pl. 3.*1–2;* OD]. Carapace longer than wide, ornamented with transverse ridges; circumgastric groove deep; rostrum with three acuminate spines distally and pair of spines at base, axially sulcate, slightly downturned; lateral margins with several long spines. *Eocene* (*Ypresian*): Italy.——Fig. 4,*5.* **E. bolcensis,* holotype, VR 93876, scale bar 1 mm (new, photo by A. Busulini, Museo di Storia naturale, Venezia, Italy).

**Lessinigalathea** De Angeli & Garassino, 2002, p. 12 [**L. regale,* p. 13, fig. 10, pl. 4,*1;* OD]. Carapace rectangular, lateral margins with five or more spines; dorsal carapace with transverse ridges, cervical groove well defined; rostrum spatulate, with three spines at tip and one on each side at base; orbits with small intraorbital and outer-orbital spines; protogastric region with row of spines anteriorly, cervical groove with three spines placed posterior to it. *Eocene* (*Ypresian*): Italy.——Fig. 4,*6.* **L. regale,* holotype, MCZ 2246, scale bar 1 cm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Luisogalathea** Karasawa & Hayakawa, 2000, p. 143 [**L. tomitai,* p. 143, fig. 4.1; OD]. Carapace longer than wide; rostrum triangular, flattened, lacking rostral spines but with tiny projection in distal one-fifth; lateral margins with tiny spines; dorsal surface with transverse ridges; cervical groove deep. *Upper Cretaceous. Upper Cretaceous* (*Santonian*): Japan.——Fig. 4,*7.* **L. tomitai,* MFM 247,010, Santonian, Japan, scale bar 5 mm (new).

**Palaeomunida** Lőrenthey, 1902, p. 101 [**P. defecta,* p. 103, pl. 1,*3;* M]. Carapace ovate, longer than wide; lateral margin with numerous spines; cervical groove deep; carapace ornamented with transverse ridges. *Eocene–Oligocene. Eocene* (*Priabonian*): Hungary, Italy. *Oligocene* (*Rupelian*): Italy.——Fig. 4,*8* **P. defecta,* E. 9369, Eocene, Hungary, scale bar 1 cm (new, photo by M. Hyžný, Comenius University, Bratislava, Slovakia).

**Tethysgalathea** Klompmaker, Robins, Jakobsen & Sheldon, 2022, p. 1090 [**Eomunidopsis prealpina* Beschin, Busulini, & Tessier in Beschin, Busulini, Tessier & Zorzin, 2016, p. 38, pl. 3,*4;* OD].

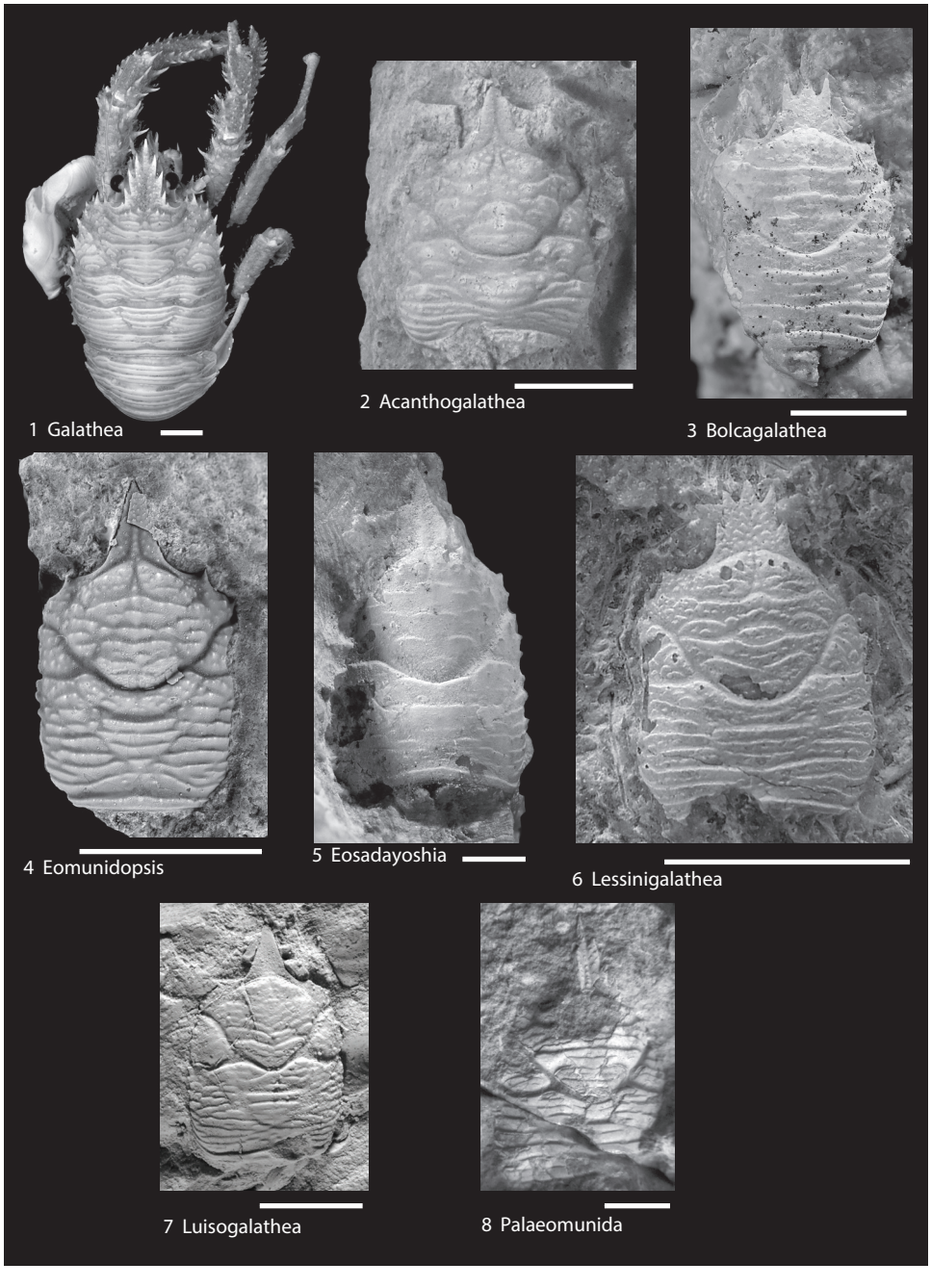


FIG 4. Galatheidae (p. 8–9).

Carapace longer than wide excluding rostrum, rectangular, strongly vaulted transversely, weakly vaulted longitudinally; front triangular, sulcate, without lateral spines; lateral margins with three or four spines anterior to cervical groove; protogastric and mesogastric regions with dorsal spines. *Eocene* (*Ypresian*): Italy.——FIG. 5. **T. prealpina* (BESCHIN & others), holotype, VR 93884, scale bar 1 mm (new, photo from A. Busulini, Museo di Storia naturale, Venezia, Italy).

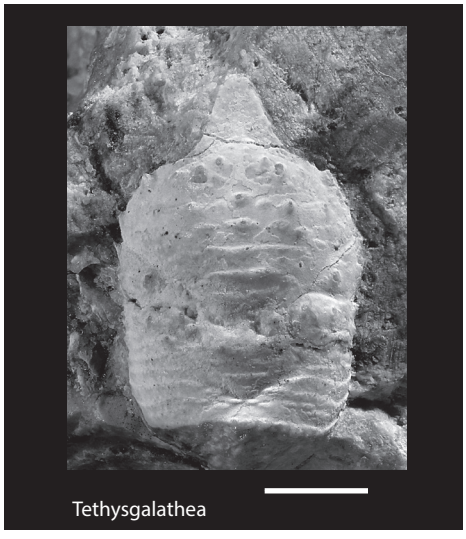


Fig 5. Galatheidae (p. 8–9).

## MUNIDIDAE Ahyong, Baba, MacPherson, & Poore, 2010

[Munididae Ahyong, Baba, MacPherson, & Poore, 2010, p. 59]

Dorsal carapace ornamented with strong transverse ridges; frontal margin almost always trifid; composed of central rostral component and one or two pairs of supraorbital spines; rostrum usually spiniform; supraorbital spines typically very narrow, needlelike; carapace usually longer than wide (excluding rostrum); pereiopods long. [Emended from Ahyong & others, 2010, p. 59; Robins, Feldman, & Schweitzer, 2012, p. 291.] *Upper Jurassic* (*Tithonian*)*–Holocene*.

**Munida** Leach, 1820, p. 52 [**Pagurus rugosus* Fabricius, 1775, p. 412; M; =*Astacus bamffius* Pennant, 1777, p. 14, pl. 13,*25;* =*Galathea longipeda* Lamarck, 1801, p. 158; =*Munida rondeletii* Bell, 1846, in 1844–1852, p. 208]. Carapace rectangular or ovoid, longer than wide; rostrum long, needlelike, flanked by one pair of supraorbital spines; two or three anterolateral spines; several small lateral spines posterior to intersection of cervical groove with lateral margin; deep, arcuate cervical groove; transverse carapace ridges range from simple and parallel to complex and bifurcating; linear array of gastric spines parallel to frontal margin. *Upper Cretaceous–Holocene. Upper Cretaceous* (*Cenomanian*): USA (Texas). *Oligocene:* USA (Washington). *Oligocene–Miocene:* Argentina. *Miocene:* Japan, USA (California, Washington). *Pliocene:* Italy, USA (California). *Holocene* subfossil: Japan. *Holocene:* Cosmopolitan.——Fig. 6,*1*. **M. rugosa* (Fabricius), USNM 20058, Holocene, North Atlantic Ocean, scale bar 1 cm (new).

**Agononida** Baba & De Saint Laurent, 1996, p. 441 [**Munida incerta* Henderson, 1888, p. 130, pl. 13,*4;* OD]. Carapace with well-defined transverse ridges, wider than long or approximately as wide as long; rostral spine and supraocular spines acuminate, narrow; outer-orbital spines long, acuminate; at least one pair of epigastric spines well defined, positioned posterior to supraocular spines; at least one pair of postcervical spines; lateral margin with spines of varying size; pleonal somites with spines; telson incompletely subdivided; male first pleonal somite lacking gonopod. [Emended from Baba & De Saint Laurent, 1996, p. 441.] *Miocene–Holocene. Miocene* (*Burdigalian*): Slovakia. *Holocene:* Indo-Pacific Ocean.——Fig. 6,*2*. *Agononida sphecia* (MacPherson, 1994), MNHN-IU-2014-10696, Holocene, New Caledonia, scale bar 1 cm (new).

**Austromunida** Schweitzer & Feldmann, 2000, p. 151 [**A. casadioi,* p. 152; OD]. Carapace approximately 1.5 times as long as wide; rostrum long, needlelike, with central keel on lower one-third; supraorbital spines absent; anterolateral and lateral margins with several small spines both anterior and posterior to cervical groove; cervical and branchiocardiac grooves deep; carapace ornamented by continuous and discontinuous transverse ridges; regions moderately well defined. *Miocene:* Argentina.——Fig 6,*3*.**A. casadioi,* KSU D 253, scale bar 5 mm (new).

**Cretagalathea** Garassino, De Angeli, & Pasini, 2008, p. 57 [**C. exigua,* p. 58, fig. 15–16; OD]. Carapace rectangular, approximately as long as wide excluding rostrum; fronto-orbital margin approximately half carapace width; lateral margins spinose; carapace ornamented with transverse ridges; pleon curled under carapace; chelipeds very long, fingers slender. *Upper Cretaceous* (*Cenomanian–Turonian*): Morocco.——Fig. 6,*4*. **C. exigua,* MSNM i26856, scale bar 5 mm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Juracrista** Robins, Feldmann, & Schweitzer, 2012, p. 292 [**J. perculta,* p. 294, fig. 2.1–2.5; OD]. Carapace subsquare excluding rostrum; frontal margin with two large supraorbital spines and central rostrum; rostrum broad, unkeeled, deflected, slightly axially sulcate, triangular or trifid tip; supraorbital spines narrowly triangular; cervical groove strong; weakening slightly anteriorly; anterior carapace regions well defined; cardiac region weakly defined; carapace ornamented with strong transverse ridges and small spines; spines adorn anterior of ridges in epigastric area; epibranchial and hepatic regions with spines; lateral margin spinose. [Emended from Robins, Feldmann, & Schweitzer, 2012, p. 292.] *Upper Jurassic* (*Tithonian*): Austria.——Fig. 6,*5*. **J. perculta,* holotype, NHMW 2007z0149/0369, scale bar 5 mm (new).

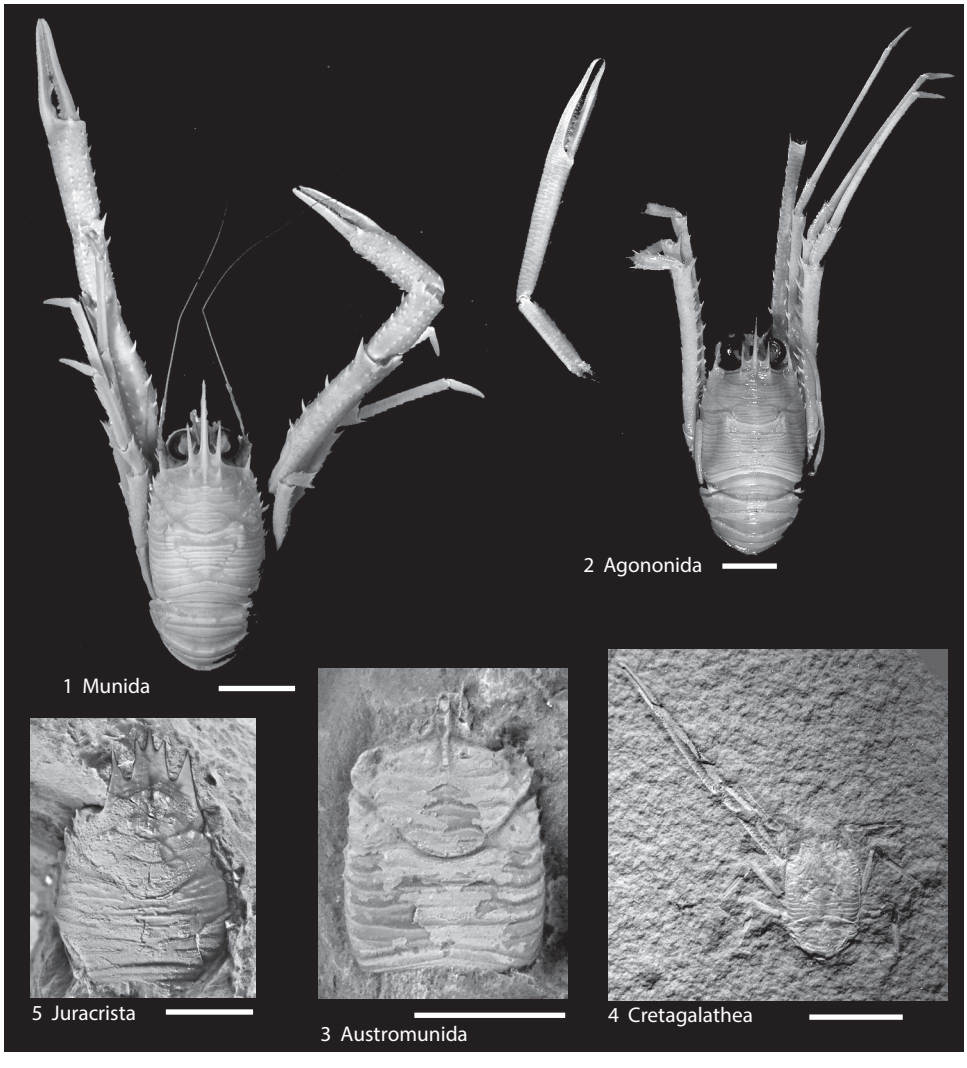


FIG 6. Munididae (p. 10).

**Muellermunida** BESCHIN, BUSULINI & TESSIER, 2021, p. 78 [**Protomunida pentacantha* MÜLLER & COLLINS, 1991, p. 57, pl. 1,*15–16;* OD]. Carapace longer than wide, rectangular, ornamented with continuous transverse ridges; rostrum acuminate, bounded by inner longer and outer shorter pairs of supraocular spines; lateral margins with spines anterior and posterior to intersection of cervical groove; epigastric regions well defined, with several spines; cervical groove deep. *Eocene. Eocene* (*Ypresian*)*:* Italy. *Eocene* (*Priabonian*): Hungary, Italy.——FIG. 7,*2*. **Muellermunida veronensis* Beschin & others, 2019, MCZ 5895, Ypresian, Italy, scale bar 1 mm (new, photo by A. Busulini, Museo di Storia naturale, Venezia, Italy).

**Protomunida** BEURLEN, 1930, p. 373 [**Galathea munidoides* SEGERBERG, 1900, p. 7, pl. 1,*5;* OD]. Carapace excluding rostrum longer than wide, subrectangular; with three-pronged rostrum, of which one major, moderately narrow, flattened spine on axis and two smaller accessory spines; forwardly directed spine at outer orbital angle; row of spines or tubercles on epigastric regions; epibranchial regions with tubercles dorsally and spines laterally; other ornamentation oriented transversely; fairly smooth, non-depressed area posterior to cardiac region. [Emended from HRYNIEWICZ & others, 2019, p. 124.] *Paleocene–Eocene. Paleocene* (*Danian*): Denmark. *Paleocene:* Spitsbergen, Norway. ?*Eocene* (*Ypresian*): Italy.——FIG. 7,*1*.

**Protomunida* sp., Paleocene, Denmark, scale bar 5 mm (new).

**Tethysmunida** De Angeli & Ceccon, 2017, p. 13 [**T. corallina,* p. 13, pl. 2,*5–6;* OD]. Carapace approximately as wide as long, posterior margin very wide; rostrum directed well beyond orbits, axially flattened, with trifid tip; orbits apparently deep, directed forward; cervical groove deep, transverse, cardiac region wide, approximately half width of carapace. *Eocene* (*Ypresian, Priabonian*): Italy.——Fig. 7,*3*. **T. corallina,* holotype, MCV.16/66-I.G. 371301, scale bar 5 mm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Valamunida** Klompmaker & Robins in Hryniewicz & others, 2019, p. 127 [**V. haeggi,* p. 127, fig. 21–22; OD]. Carapace longer than wide, rostrum trifid, spines on lateral margins of epibranchial anterior of meta-mesobranchial regions, grooves deeply incised; mesogastric, protogastric, and epigastric divisions pronounced; epigastric regions with strong spine surrounded by tubercles, anterior ones in row; hepatic and epibranchial regions slightly inflated, ornamented with tubercles; cardiac region elevated above remainder of carapace; intestinal area smooth to less ornamented, deeply depressed near posterior margin. [Emended from Klompmaker & Robins in Hryniewicz & others, 2019, p. 217.] *Paleocene:* Spitsbergen, Norway.——Fig. 7,*4*. **V. haeggi,* holotype, NRM-PZ Ar68001a, scale bar 5 mm (new).

## Family Munidopsidae Ortmann, 1898

[*nom. transl*. Ahyong, Baba, MacPherson, & Poore, 2010, p. 63, *ex* Ortmann, 1898 in 1898–1901, p. 1151] [=Shinkaiinae Baba & Williams, 1998, p. 152]

Carapace longer than wide excluding rostrum; rostrum strong; typically keeled; one small outer-orbital spine usually present; circumgastric groove usually present; strongest groove on dorsal carapace, surrounding gastric region; branchiocardiac groove always present; lateral margins usually spinose; ornamentation usually consisting of pustules or tubercles of varying shapes; gastric area well defined; epibranchial, metabranchial, and cardiac regions moderately well to extremely well defined; telson separated into multiple plates; chelipeds ovate in cross-section. [Emended from Ahyong & others, 2010; Robins, Feldmann, & Schweitzer, 2013.] *Middle Jurassic* (*Bathonian*)*–Holocene*.

**Ambulocapsa** Robins, Feldmann, & Schweitzer, 2013, p. 202 [**A. altilis,* p. 203, fig. 9.1–9.2; OD]. Carapace widening posteriorly, strongly vaulted transversely and anteriorly longitudinally, approximately as wide as long excluding rostrum; rostrum deflected downward, broadly triangular to spatulate in shape, may be spined at tip; rostral keel continuous, extending full length of rostrum, composed of nodes, or nodes basally then changing to small ridge or crease distally; small outer orbital spine present; small spines on lateral margins; circumgastric groove strong; branchiocardiac groove weakly defined; gastric regions (mesogastric, metagastric, epigastric, protogastric) weakly defined. [Emended from Robins, Feldmann, & Schweitzer, 2013, p. 202.] *Upper Jurassic* (*Tithonian*): Austria, Czech Republic.——Fig. 7,*5*. **A. altilis,* holotype, NHMW 2007z0149/0130, Tithonian, Austria, scale bar 5 mm (new).

**Ankylokypha** Robins, Feldmann, & Schweitzer, 2013, p. 209 [**A. parabola,* p. 210, fig. 10.1–10.3; OD]. Carapace subrectangular, extremely vaulted transversely, moderately vaulted longitudinally, slightly longer than wide; rostrum triangular, strongly deflected downward, sharp, with strong keel; circumgastric and branchiocardiac grooves deep, well defined; metagastric, hepatic, epibranchial, cardiac, and metabranchial regions well defined; mesogastric, protogastric, urogastric, and mesobranchial regions moderately defined; epigastric region weakly indicated; all regions separated by distinct grooves; regions ornamented with transverse tubercles. [Emended from Robins, Feldmann, & Schweitzer, 2013. p. 209.] *Upper Jurassic* (*Tithonian*): Austria, Czech Republic.——Fig. 7,*6*. **A. parabola,* holotype, NHMW 2007z0149/0089, Tithonian, Austria, scale bar 5 mm (new).

**Aulavescus** Robins, Feldmann, & Schweitzer, 2013, p. 211 [**A. exutus,* p. 213, fig. 11.4; OD). Carapace widening posteriorly, moderately to strongly vaulted transversely, moderately vaulted longitudinally; rostrum long, subtriangular, bearing weak keel which almost disappears approaching tip of rostrum, rostral tip may appear sulcate, rostrum narrowing at anterior to form blunted or tridentate point, ornamented with small granules; circumgastric groove moderately strong; branchiocardiac groove weak; hepatic, epibranchial, and gastric regions moderately defined; mesogastric, epigastric, metagastric, urogastric, and cardiac regions weakly to moderately defined; lateral margins of hepatic region angled anteriorly toward rostrum, not parallel with lateral margin of remainder of carapace; metagastric region slightly raised above remainder of gastric area; anterior segment of mesogastric region well defined; urogastric region large, clearly defined laterally by depressions, not clearly delimited from cardiac region; Epigastric, mesobranchial, and cardiac regions weakly inflated; ornamentation consists of squamous or slightly elongated tubercles. [Emended from Robins, Feldmann & Schweitzer, 2013.] *Upper Jurassic* (*Kimmeridgian*): Germany. (*Tithonian*): Austria.——Fig. 7,*7*. **A. exutus,* holotype, NHMW 2007z0149/0117, Tithonian, Austria, scale bar 5 mm (new).

**Brazilomunida** Martins-Neto, 2001, p. 241 [**Galatheites brasiliensis* Beurlen, 1965, p. 268, fig. 2; OD]. Rostrum triangular, entire; orbits with

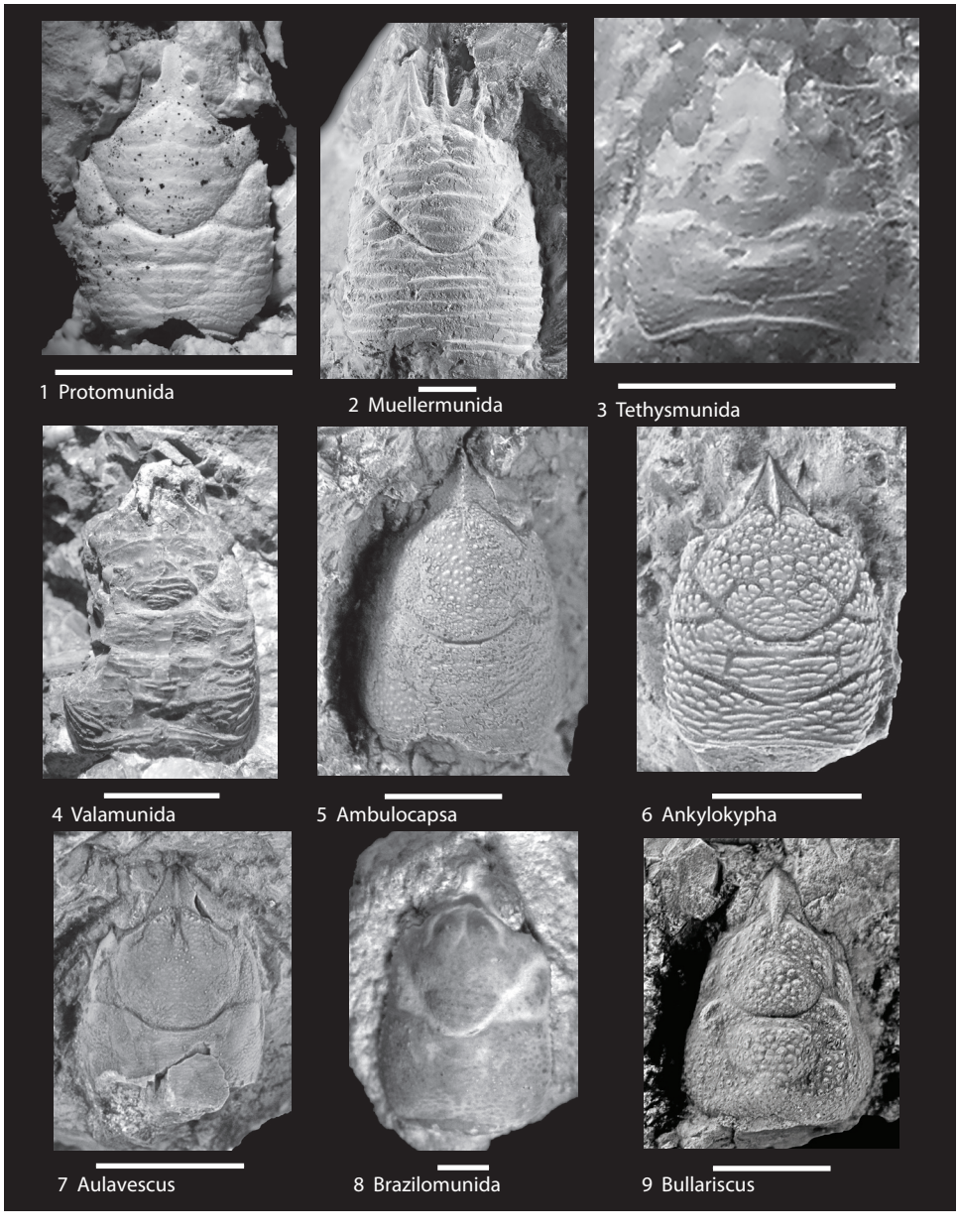


FIG 7. Munididae, Munidopsidae (p. 11–14).

outer-orbital spine; circumgastric and branchiocardiac grooves well developed; lateral margin with small spines anteriorly; dorsal carapace with tubercles and granules arranged into longitudinal rows. *Lower Cretaceous* (*Albian*): Brazil.——FIG. 7,*8*. **B. braziliensis* (BEURLEN), holotype, EGR-2140, scale bar 1 mm (new, photo by P. Sucerquia, Universidade Federal de Pernambuco, Brazil).

**Bullariscus** ROBINS, FELDMANN, & SCHWEITZER, 2013, p. 215 [**B. patruliusi,* p. 217, fig. 12.1–12.2; OD]. Carapace triangular, widening slightly posteriorly, very strongly vaulted transversely, moderately vaulted longitudinally, approximately as long as wide excluding rostrum; rostrum triangular with blunted tip and smooth lateral margins, arcing downward, bearing extremely strong keel

decreasing in both breadth and height over entire length of rostrum; small outer orbital spine present; circumgastric and branchiocardiac grooves very strong; mesogastric, metagastric, hepatic, epibranchial, mesobranchial, cardiac, and metabranchial regions well defined; intestinal region weakly to moderately defined; ornamentation consisting of tubercles. [Emended from Robins, Feldmann, & Schweitzer, 2013, p. 215.] *Upper Jurassic* (*Tithonian*): Austria, Poland.——Fig. 7,*9*. **B. patruliusi*, holotype, NHMW 2007z0149/0089, Tithonian, Austria, scale bar 5 mm (new).

**Calteagalathea** De Angeli & Garassino, 2006, p. 274 [**C. friulana,* p. 274, fig. 4a–4b; OD]. Carapace approximately as wide as long excluding rostrum, highly vaulted transversely; orbits well developed, rimmed; rostrum wide, spatulate, with spines on tip; lateral margins with bulbous swellings; mesogastric region well defined; circumgastric groove deep; protogastric, hepatic, and subhepatic regions well defined; carapace covered with coarse, scabrous ornamentation. *Upper Cretaceous* (*Maastrichtian*): Italy.——Fig. 8,*1*. **C. friulana,* holotype, MFSN 19969, scale bar 1 cm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Cracensigillatus** Robins, Feldmann, & Schweitzer, 2013, p. 224 [**Galathea acutirostris* Moericke, 1889, p. 53, pl. 6,*7;* OD]. Carapace subrectangular, parallel sided, moderately to strongly vaulted transversely, weakly vaulted longitudinally, longer than wide excluding rostrum; rostrum long, narrow, acuminate, moderately to strongly keeled along length; small triangular outer orbital spine; lateral margins straight with very small spines; circumgastric groove strong; weakening slightly anteriorly; branchiocardiac groove slightly marked to moderately well defined; carapace ornamented uniformly with round to transversely ovate tubercles; urogastric region usually well defined; posterior margin strongly rimmed. [Emended from Robins, Feldmann, & Schweitzer, 2013, p. 224.] *Upper Jurassic* (*Tithonian*): Austria, Czech Republic, Poland, Romania——Fig. 8,*2*. **C. actutirostris* (Moericke), lectotype, BSP AS III 337, Tithonian, Austria, scale bar 5 mm (new).

**Cristinagalathea** Beschin, Busulini, & Tessier, 2021, p. 79 [**C. striata,* p. 80, fig. 19–20; OD]. Carapace longer than wide including rostrum, wider than long excluding rostrum; rostrum very large, long, wide, axially sulcate, with several lateral and apical spines; cervical groove moderately deep; regions not well differentiated, branchial regions short; entire carapace ornamented with transverse ridges. *Eocene* (*Ypresian*): Italy.——Fig. 10,*9*. **C. striata*, holotype, MCZ 5906, scale bar 1 cm (new, photo by A. Busulini, Museo di Storia naturale, Venezia, Italy).

**Culmenformosa** Robins, Feldmann, & Schweitzer, 2013, p. 230 [**C. glaessneri,* p. 232, fig. 14.1; OD]. Carapace rectangular, widening posteriorly, moderately vaulted transversely, usually slightly longer than wide excluding rostrum; rostrum spatulate, with keel extending half of rostral length, keel may be expressed as small nodes, tip of rostrum bears seven or nine spines or lobes; small outer orbital spines usually present; lateral margins with small, forward-directed spines, largest on metabranchial regions; circumgastric groove strong; usually weakening anteriorly; branchiocardiac groove weakly, but always, defined; gastric regions well defined; carapace ornamented with distinct rows of tubercles of varying shapes and sizes, spherical anteriorly, becoming scabrous posteriorly, largest at anterior of regions; posterior margin weakly rimmed. [Emended from Robins, Feldmann, & Schweitzer, 2013, p. 230.] *Upper Jurassic* (*Tithonian*): Austria, Czech Republic.——Fig. 8,*3*. **C. glaessneri,* holotype, NHMW 2007z0149/0184, Tithonian, Austria, scale bar 2 mm (new).

**Faxegalathea** Jakobsen & Collins, 1997, p. 91 [**F. platyspinosa,* p. 91, pl. 2,*3–7*, text-fig. 1a; OD]. Carapace strongly vaulted transversely; rostrum trifid, each major spine with smaller subspines; outer-orbital spine large, forward directed; lateral margins with numerous spines; epigastric regions with oblong swellings; mesogastric region with one oblong and one rounded swelling; circumgastric groove moderately deep; carapace ornamented with densely spaced granules of varying sizes. *Paleocene–Eocene. Paleocene* (*Danian*): Denmark. *Eocene* (*Ypresian*): Italy.——Fig. 8,*4*. **F. platyspinosa,* cast of holotype, MGUH 24372, Paleocene, Denmark, scale bar 2 mm (new, photo by S. Jakobsen, Geomuseum Faxe, Denmark).

**Gastrosacus** Von Meyer, 1851, p. 677 [**G. wetzleri;* M]. Carapace subrectangular, usually widening posteriorly; carapace moderately convex transversely; rostrum narrowly triangular, styliform, strongly keeled; carapace strongly ornamented with large tubercle or pustular spines anteriorly, grading to transversely ovate pustules posteriorly, increasing in size approaching lateral branchial margin; posterior of mesogastric region well defined, raised above remainder of gastric region. *Middle Jurassic* (*Bathonian*): France. *Upper Jurassic–Upper Cretaceous. Upper Jurassic* (*Oxfordian*): Czech Republic, France, Germany, UK (England). *Upper Jurassic* (*Kimmeridgian*): Germany. *Upper Jurassic* (*Tithonian*): Austria, Czech Republic, Poland, Romania. *Lower Cretaceous* (*Berriasian–Hauterivian*): France, Switzerland. *Upper Cretaceous* (*Maastrichtian*): The Netherlands.——Fig. 8,*5*. **G. wetzleri,* lectotype, BSP IX 683, Tithonian, Czech Republic, scale bar 5 mm (new).

**Mizunotengus** Karasawa & Ando in Karasawa, Mizuno, Hachiya, & Ando, 2017, p. 48 [**M. makiguchimai,* p. 48, pl. 2–11; OD]. Carapace pyriform, slightly longer than wide, weakly vaulted transversely and longitudinally; fronto-orbital margin ~40% of maximum carapace width; rostrum long, acute, ~35% of maximum carapace length, gently downturned, with unarmed lateral margins and medial, dorsal keel extending onto carapace; supraocular spine absent; upper orbital margin concave, entire; outer orbital spine long, needle-like, directed forward; anterolateral spine much

shorter than outer orbital margin, needlelike, directed forward; lateral margins convex with forwardly directed spines, anterior three spines long, needlelike, fifth spine triangular; remainder of six to seven lateral spines short, triangular, closely spaced; posterior margin slightly concave; dorsal surface finely tuberculate, without transverse ridge; circumgastric groove well defined, sinuous; cardiac region inverted triangular, separated from anterior branchial regions by rather deep posterior cervical groove; branchiocardiac groove shallow; branchial regions with weak arcuate ridge parallel to lateral margin; thoracic sternum broadly triangular, gently concave axially, with smooth surface; sternites 3–7 fused, separated from one another by deep grooves, bearing deep, axial, median groove; surfaces of pleonal somites 1–6 smooth or finely tuberculate dorsally; somite 1 narrow, reduced; terga of somites 2 and 3 with anterior transverse ridge; pleura of somites 2–5 well developed; tergum of somite 6 with shallow, longitudinal median groove; posterior margin convex; pleura of somite 6 much wider than long, diverging laterally, divided from tergum by rather deep groove converged distally; telson tuberculate dorsally, consisting of several plates; dactylus and fixed finger of chelipeds thin, slender, ~40% propodus length, with finely serrated dorsal and occlusal margins; occlusal margins of both fingers not gaped; surface of palm, carpus, and merus sparsely covered with irregularly sized spines inclined anteriorly; dorsal, lateral, and ventral rows of spines present, mesial spines long, well developed; pereiopods 2–4 long, slender, flattened, ornamented with variably sized spines, narrower than pereiopod 1. [Emended from Karasawa & Ando in Karasawa & others, 2017, p. 48–49.] *Miocene* (*Burdigalian*): Japan.——Fig. 8,*6*. **M. makiguchimai,* paratype, MFM 83082-1, scale bar 1 cm (new).

**Munidopsis** Whiteaves, 1874, p. 212 [**M. curvirostra*; M] [=*Anoplonotus* Smith, 1883, p. 50 (type, *A. politus*, p. 50, pl. 2,*1*, pl. 3,*1–5a,* M); =*Bathyankyristes* Alcock & Anderson, 1894, p. 173 (type, *B. spinosus*, p. 174, pl. 9, SD Fowler, 1912, p. 574) =*Elasmonotus* A. Milne-Edwards, 1880, p. 60 (type, *E. longimanus,* p. 60, SD Fowler, 1912, p. 574); =*Orophorynchus* A. Milne-Edwards, 1880, p. 58 (type, *O. aries,* p. 58, SD Faxon, 1895 p. 82); =*Galathodes* A. Milne-Edwards, 1880, p. 53 (type, *G. erinaceus,* p. 53, SD Fowler, 1912, p. 574); =*Galathopsis* Henderson, 1885, p. 417 (type, *Galathopsis laevigata* Henderson, 1885, p. 417, present designation)]. Carapace ornamented with short, scabrous ridges; lateral margins with few small spines anteriorly, remainder of margin relatively smooth; rostrum flattened or needlelike, long, typically with a keel; circumgastric groove well developed; carapace regions moderately developed to well developed; gastric regions ovate or circular, inflated. *Upper Cretaceous* (*Campanian*): West Antarctica. *Eocene–Holocene. Eocene:* Antarctica (Peninsula), Canada (British Columbia). *Miocene* (*Burdigalian*): Slovakia. *Miocene* (*Burdigalian/Langhian*): Japan. *Miocene* (*Langhian–Serravallian*): Slovenia. *Langhian:* Bosnia and Herzegovina. *Pleistocene:* Italy. *Holocene:* Atlantic Ocean, Indo-Pacific Ocean, Indian Ocean, Australia, Antarctica.——Fig. 8,*7*. **Munidopsis scabrosa* Feldmann & Wilson, 1988, holotype, USNM PAL 404851, Eocene, Antarctica, scale bar 5 mm (new).

**Octoeurax** Robins, Feldmann, & Schweitzer, 2013, p. 237 [**O. acaresprora,* p. 238, fig. 15.1; OD]. Carapace subrectangular, moderately vaulted transversely, weakly vaulted longitudinally, longer than wide excluding rostrum; rostrum short, narrow, acuminate, strongly keeled; circumgastric groove well defined; branchiocardiac groove moderately defined; mesogastric, hepatic, epibranchial, metagastric, urogastric, cardiac, and metabranchial regions well defined; epigastric and mesobranchial regions weakly defined; metagastric region slightly raised from remainder of gastric region; urogastric region narrowest anterior to cardiac region, widening laterally; lateral margins weakly concave, urogastric region very large; cardiac region triangular; carapace ornamented with transversely ovate tubercles varying in size. [Emended from Robins, Feldmann, & Schweitzer, 2013, p. 237.] *Upper Jurassic* (*Tithonian*): Austria.——Fig. 8,*8*. **O. acaresprora,* holotype, NHMW 2007z0149/0126, scale bar 5 mm (new).

**Palaeomunidopsis** Van Straelen, 1925, p. 307 [**Gastrosacus moutieri* Van Straelen, 1923, p. 553; M]. Carapace with deep circumgastric groove; lateral sides straight, parallel; rostrum triangular; branchial regions long; carapace covered with scabrous ornamentation. *Middle Jurassic* (*Bathonian*): France.——Fig. 8,*9*. **P. moutieri* (drawing, Van Straelen, 1925).

**Palmunidopsis** Fraaije, 2014, p. 234 [**P. muelleri,* p. 235, pl. 1; OD]. Carapace rectangular, regions strongly defined; rostrum acuminate, strongly keeled, keel extending onto dorsal carapace to mesogastric region; circumgastric groove deep, lateral margins possibly with spines; protogastric, hepatic, and mesogastric regions inflated; branchial regions with strong bulbous inflations lateral to strongly depressed urogastric; posterior margin strongly rimmed; chelae elongate. *Miocene* (*Tortonian*): Cyprus.——Fig. 10,*1*. **P. muelleri,* holotype, MAB k.3284, scale bar 5 mm (new, photo by R. Fraaije, Oertijdmuseum, Boxtel, The Netherlands).

**Pegomyrmekella** Robins, Feldmann, & Schweitzer, 2013, p. 239 [**P. chaulia,* p. 240, fig. 15.2; OD]. Carapace subrectangular, moderately vaulted transversely, approximately as long as wide, excluding rostrum; rostrum narrow, strongly keeled; posteriormost part of circumgastric groove strong, weakening anteriorly; branchiocardiac groove strong; epibranchial, metagastric, urogastric, cardiac, and branchial regions well defined; epigastric, protogastric, mesogastric, and mesobranchial regions moderately defined; cardiac region extremely wide, four times as wide as long; lateral margins spinose; posterior margin with pustulose rim; carapace ornamented with large pustules and pustular spines

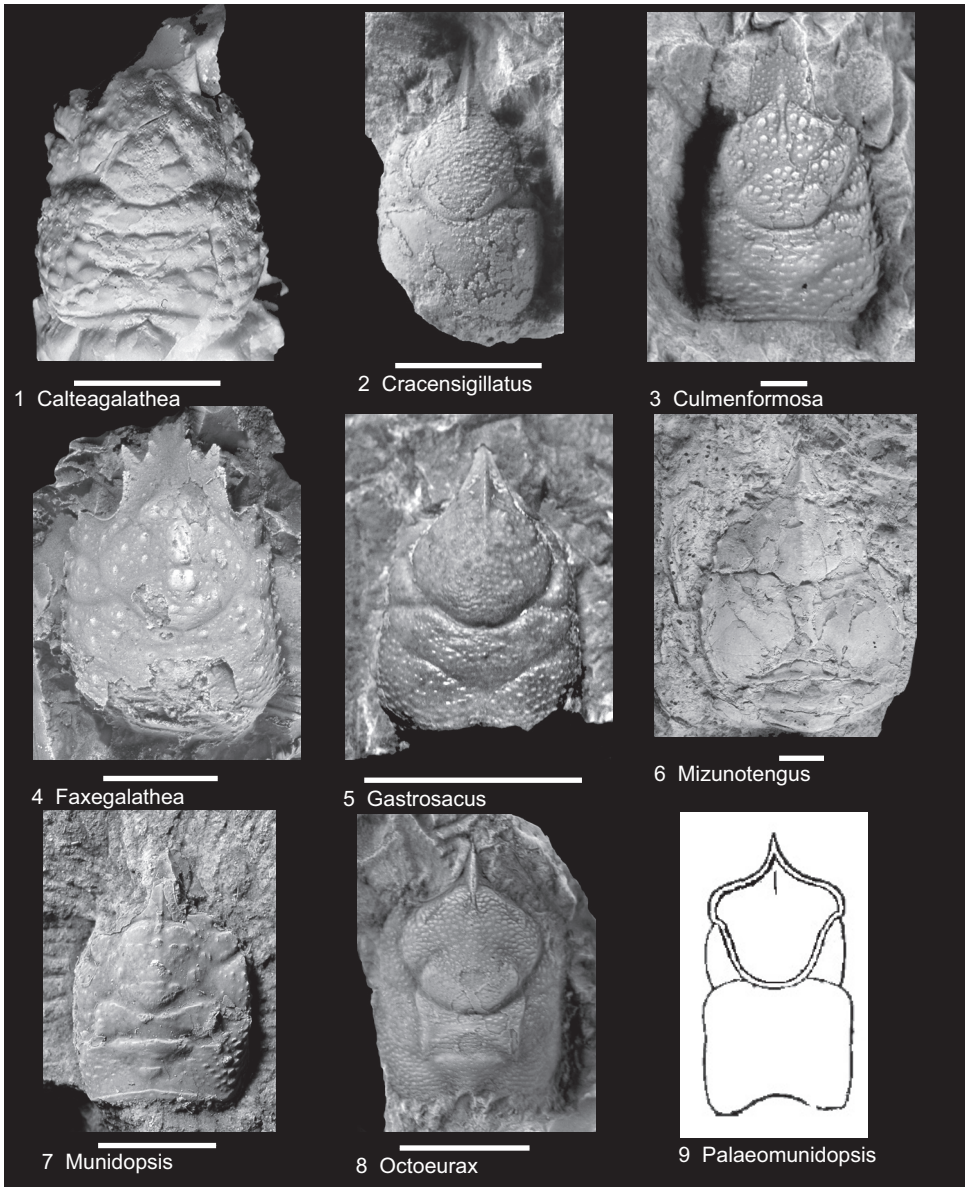


FIG 8. Munidopsidae (p. 14–15).

directed anteriorly. [Emended from ROBINS, FELDMANN, & SCHWEITZER, 2013, p. 239.] *Upper Jurassic* (*Tithonian*): Austria.——FIG. 10,*2*. **P. chaulia,* holotype, NHMW 2007z0149/118, scale bar 2 mm (new).

**Raymunida** MACPHERSON & MACHORDOM, 2000, p. 253 [**R. cagneti,* p. 254, fig. 1–2; OD]. Carapace with strong transverse ridges; central rostral spine strongest; one spine on frontal margin between outer-orbital and anterolateral spines; epigastric spines present in row; typically with parahepatic, anterior branchial and postcervical spines; lateral margins with four or five spines. *Eocene* (*Lutetian*): USA (Washington). *Oligocene–Miocene:* USA (Alaska). *Holocene:* Indian Ocean, Pacific Ocean.—FIG. 9. **R. cagneti,* holotype, MNHN-IU-2010-1691, Holocene, French Polynesia, scale bar 1 cm (photo by N. Mollaret, Project RECOLNAT, MNHN).

**Shinkaia** BABA & WILLIAMS, 1998, p. 148 [**S. crosnieri,* p. 148, fig. 1,3–1,6; OD]. Carapace ovate, longer

than wide; rostrum flat, spatulate, with or without lateral spines; two antennal (of Baba & Williams, 1998; =anterolateral spine of McLaughlin, 1980) spines; weak, simple, nearly straight circumgastric groove; with or without tiny spines along entire lateral margins of carapace; simple carapace ornamentation consisting of small scabrous ridges; deep pit on inner surface of fixed finger of cheliped; long spines on upper surface of carpus of cheliped; eyes reduced. [Emended from Schweitzer & Feldmann, 2008, p. 1022.] *Eocene–Holocene. Eocene* (*Ypresian*): USA (Washington). *Holocene:* Indo-Pacific Ocean.——Fig. 10,*3*. **S. crosnieri,* paratype, USNM PAL 536287, Ypresian, Washington, USA, scale bar 5 mm (new).

**Vetoplautus** Robins, Feldmann, & Schweitzer, 2013, p. 240 [**V. latimarginus,* p. 241, fig. 15.3; OD]. Carapace subpentagonal in shape, widening posteriorly, wider than long excluding rostrum, moderately vaulted transversely and longitudinally; rostrum appearing to be broad, keeled, keel composed of strong nodes or broken spines; lateral margins spinose; posterolateral margin rounded at posterolateral angle; circumgastric groove strong; branchiocardiac groove moderately strong; most carapace regions well defined; small, circular region present between epigastric and protogastric regions, separated from remainder of gastric region by shallow grooves; anterior regions ornamented with row of tubercles on anterior borders, remaining parts of anterior regions ornamented with less defined tubercles; posterior regions ornamented with transversely scabrous ridges. [Emended from Robins, Feldmann & Schweitzer, 2013, p. 215.] *Upper Jurassic* (*Tithonian*): Austria, Czech Republic.——Fig. 10,*4*. **V. latimarginus,* holotype, NHMW 2007z0149/0151, scale bar 2 mm (new).

## Family PARAGALATHEIDAE Robins, Feldmann, Schweitzer, & Bonde, 2016

[Paragalatheidae Robins, Feldmann, Schweitzer, & Bonde, 2016, p. 70]

Strong convex dorsal carapace; rostrum extremely broad, downturned; spatulate to nearly rectangular in shape; width equal to or greater than two thirds of width of frontal margin; not differentiated to slightly differentiated by chevron pattern of ornamentation from main body of carapace; carapace with weak to moderately strong concave forward cervical groove; regions not delimited or weakly delimited; ornamentation consists of squamous or rounded tubercles or transverse ridges. [Emended from Robins & others, 2016, p. 70.] *Upper Jurassic* (*Kimmeridgian–Tithonian*).

**Paragalathea** Patrulius, 1959, p. 252 [**Galathea verrucosa* Moericke, 1889, p. 55, pl. 6,*9;* OD].


Fig 9. Munidopsidae (p. 16).

Carapace longer than wide, widening posteriorly; with uniform, warty ornamentation and weak definition of regions; strongly vaulted transversely; rostrum extremely broad, broadly tridentate, with serrate tip. *Upper Jurassic* (*Tithonian*): Austria, Czech Republic, Poland, Romania.——Fig. 10,*5*. **P. verrucose* (Moericke), lectotype, BSP AS III 313, Tithonian, Austria, scale bar 2 mm (new).

**Discutiolira** Robins, Feldmann, Schweitzer, & Bonde, 2016, p. 87 [**Galathea eutecta* Moericke, 1889, p. 52, pl. 6,*5;* OD]. Carapace moderately convex; widening posteriorly; maximum width roughly equal to length; rostrum downturned, with or without keel, broadly triangular or pentagonal; cervical groove well defined; epigastric and mesogastric regions slightly to moderately well defined by weak groove; cardiac region slightly defined; carapace, including rostrum, ornamented with transverse ridges [Emended from Robins & others, 2016, p. 87.] *Upper Jurassic* (*Tithonian*): Austria, Czech Republic, Romania, Poland.——Fig. 10,*6*. *D. eutecta* (Moericke), NHMW 2007z0149/0375, Tithonian, Austria, scale bar 5 mm (new).

**Lemacola** Robins, Feldmann, Schweitzer, & Bonde, 2016, p. 95 [**L. jenniferae,* p. 95, fig. 10.1–10.2; OD]. Carapace moderately convex, subrectangular in shape; rostrum subtriangular to sub-pentagonal

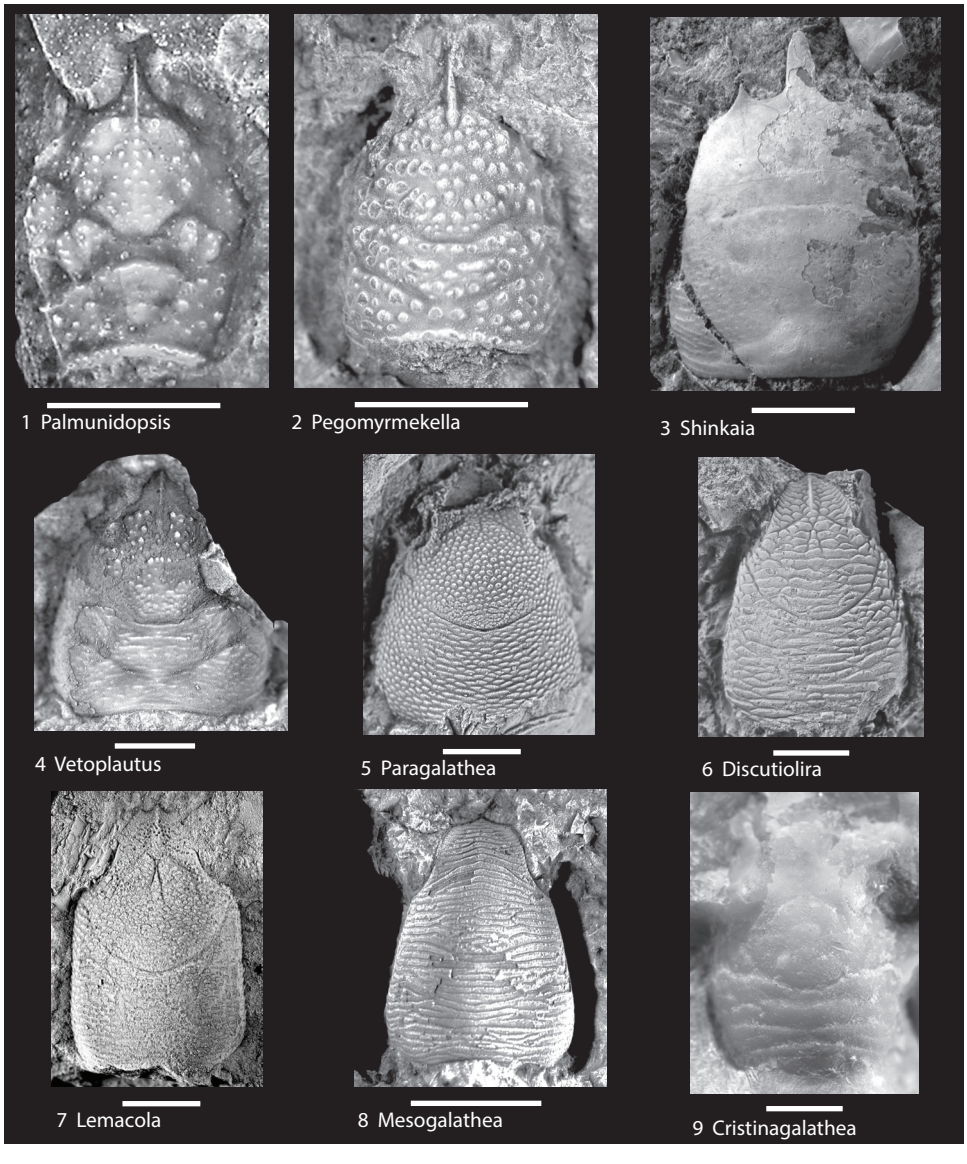


FIG 10. Munidopsidae, Paragalatheidae (p. 14–18).

with weak medial keel, tip of rostrum tridentate; cervical groove moderately defined; regional definition weak; carapace, including rostrum, ornamented with short transversely ovate tubercles or faint ridges. [Emended from ROBINS & others, 2016, p. 95.] *Upper Jurassic* (*Tithonian*): Austria, Romania.——FIG. 10,*7*. **L. jenniferae,* holotype, NHMW 2007z0149/0425, Tithonian, Austria, scale bar 2 mm (new)

**Mesogalathea** HOUŠA, 1963, p. 104 [**Galathea striata* REMEŠ, 1895, p. 200, fig. 3; OD]. Carapace subrectangular to sub-oval; strongly convex, maximum width roughly equal to length; ornamented exclusively with transverse striae; rostrum very broad, without keel; ends in broadly tridentate tip; cervical groove weakly to moderately defined; regions usually undefined. [Emended from ROBINS & others, 2016, p. 95.] *Upper Jurassic* (*Kimmeridgian–Tithonian*): Slovenia. *Upper Jurassic* (*Tithonian*): Austria, Czech Republic, Romania, Poland.——FIG. 10,*8*. **M. striata* (REMEŠ), NHMW 2007z0149/0260, Tithonian, Austria, scale bar 5 mm (new).

## Family PORCELLANIDAE Haworth, 1825

[Porcellanidae Haworth, 1825, p. 184]

Carapace dorsoventrally flattened, ovate, wider than long or longer than wide, commonly widest in posterior half, carapace regions usually weakly defined; rostrum triangular, bilobed, trilobed, or quadrilobed, may be downturned, may be very short or extending moderately beyond orbits; orbits generally anterolaterally directed and situated on side of rostrum or at base of rostrum, outer-orbital spine or projection reduced but often present; anterolateral and posterolateral margins confluent, may be entire or with spines, projections, tubercles, or granules, may be notched at intersection of cervical groove; pterygostomial region short, may be calcified, membranous, or composed of plates and membranes; entire dorsal carapace well calcified; antenna with elongate flagellum, first pereiopods chelate, pereiopods 2–4 not chelate, pereiopod 5 greatly reduced and may rest on dorsal carapace; pleon symmetrical, broad, folded under body but not closing sterno-pleonal cavity as in Brachyura, first segments visible dorsally; telson and uropods well developed, telson divided into five or seven plates; female with uniramous pleopods on fourth, fifth and sometimes third pleonal somites; males with pleopods on second somite, male pleopods 3–5 absent. [Emended from Schweitzer & Feldmann, 2010, after Haig 1960, 1965; Osawa, 1998; Harvey, 1999; Poore, 2004; McLaughlin & others, 2002, McLaughlin, Lemaitre, & Sorhannus, 2007; ABRS, 2009.] *Upper Jurassic* (*Tithonian*)*–Holocene.*

**Porcellana** Lamarck, 1801, p. 153 [**Cancer platycheles* Pennant, 1777, p. 5; M] [=*Platycheles* Billberg, 1820, p. 134, *nom. nud.;* =*Enostea* Gistel, 1848, p. 159, unnecessary replacement name for *Porcellana*]. Carapace somewhat longer than wide; dorsal surface smooth or granular; rostrum short, with multiple lobes, barely extending beyond orbits; lateral margins entire or with posterolateral spines; cervical groove weak; chelae large, flattened. [Emended from Haig, 1978, p. 707.] *Eocene–Holocene. Eocene* (*Ypresian, Priabonian*): Italy. *Holocene:* Cosmopolitan.——Fig. 11,*1.* **P. platycheles* (Pennant), USNM 1256061, Holocene, UK, scale bar 1 cm (new).

**Beripetrolisthes** De Angeli & Garassino, 2002, p. 18 [**B. mulleri,* p. 19, text-fig. 15, pl. 7,*1–2;* OD]. Carapace deltoid to cordate, widest approximately three-quarters the distance posteriorly; front triangular, orbits oblique, directed anterolaterally, situated at base of rostrum; anterolateral margin with two spines not including tiny postorbital spine; lateral margins with several spines parallel to it but situated on dorsal carapace; cervical groove weak; branchial regions with several spines arranged in arcuate pattern on anterior half, transverse ridges on lateral edges of branchial region. *Eocene* (*Priabonian*): Italy.——Fig. 11,*2.* **B. mulleri,* holotype, MCZ 2216, scale bar 2 mm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Cretacolana** Schweitzer & Feldmann, 2012, p. 20 [**Porcellana antiqua* A. Milne-Edwards, 1882, article 1; OD]. Carapace ovate, widest in posterior one-third; rostrum triangular; orbits small, circular, with weak outer-orbital spine; anterolateral and posterolateral margins convex; cervical groove concave forward, weak; carapace surface with fine transverse striae; pleonites smooth; somite 6 with uropods, termination of exopod appearing to be straight; telson narrowing posteriorly, with at least three plates; antennae with at least three strong basal elements; pereiopods 2–4 ending in lanceolate dactyli. [Emended from Schweitzer & Feldmann, 2012, p. 20.] *Upper Cretaceous* (*Cenomanian*): France.——Fig. 11,*3.* **C. antiqua* (A. Milne-Edwards), holotype, MNHN.F B16570, scale bar 5 mm (new).

**Disipia** Beschin, Busulini, Tessier, & Zorzin, 2016, p. 42 [**D. sorbinii,* p. 42, pl. 4,*5;* OD]. Carapace approximately as wide as long excluding rostrum and orbital margins; rostrum triangular, with three tiny spines at tip; orbits oblique, positioned at base of rostrum; cervical groove deep; posterior portion of carapace with weak transverse ridges. *Eocene* (*Ypresian, Priabonian*): Italy.——Fig. 11,*4.* **D. sorbinii,* holotype, VR 93900, scale bar 2 mm (new, photo by A. Busulini, Museo di Storia naturale, Venezia, Italy).

**Eopetrolisthes** De Angeli & Garassino, 2002, p. 20 [**Petrolisthes*? *striatissimus* Müller & Collins, 1991, p. 59, pl. 2,*8;* OD]. Carapace cordate, widest approximately half the distance posteriorly not including rostral length; rostrum wide, axially notched, with serrated tip; orbits situated obliquely on side of rostrum, widely rimmed, outer orbital spine directed weakly anterolaterally, followed by small spine; lateral margins convex, one spine posterior to intersection of branchiocardiac groove with margin; cervical and branchiocardiac grooves well defined; carapace ornamented with discontinuous transverse ridges, ridges shorter posteriorly. *Eocene* (*Priabonian*): Hungary, Italy.——Fig. 11,*5.* **E. striatissimus* (Müller & Collins), MCZ 2198, Italy, scale bar 2 mm (new, photo by A. De Angeli,

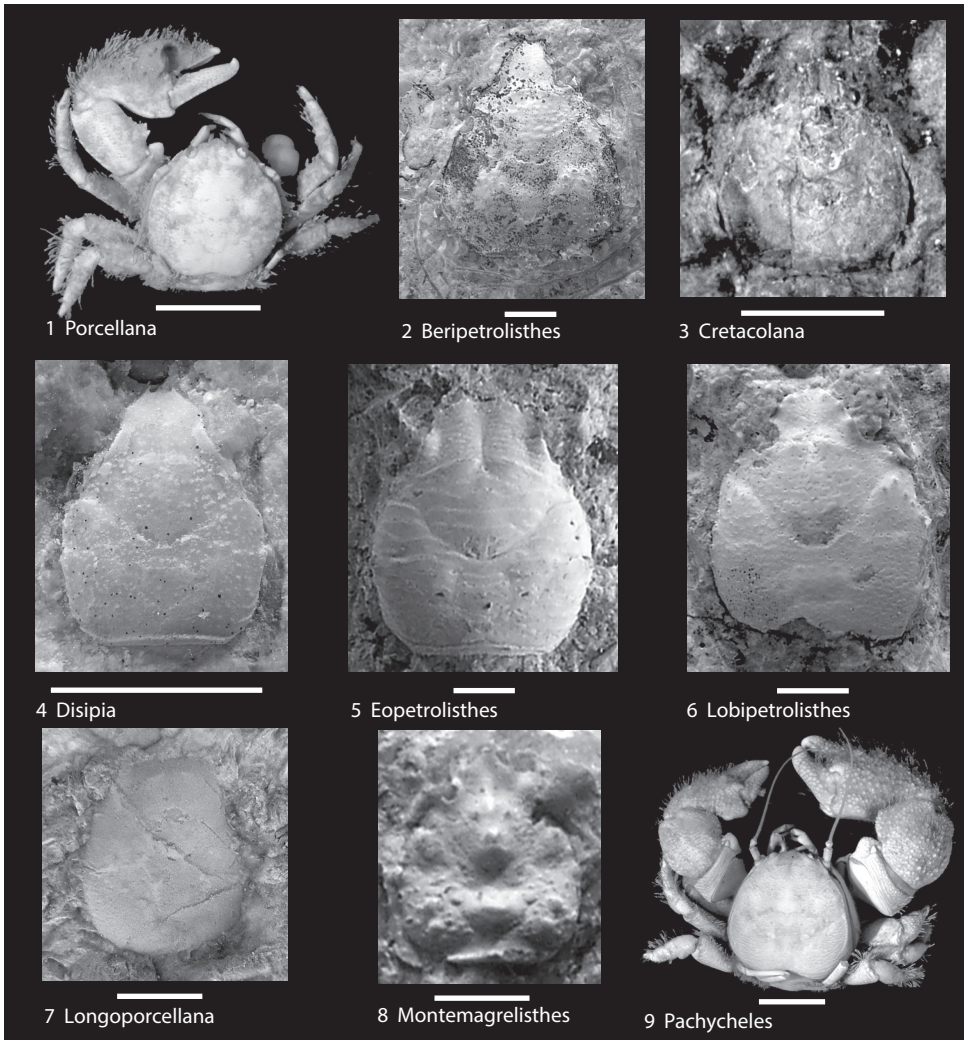


Fig 11. Porcellanidae (p. 19–21).

Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Lobipetrolisthes** De Angeli & Garassino, 2002, p. 21 [**L. blowi,* p. 21, text-fig. 17, pl. 8,*1–3;* OD]. Carapace cordate, approximately as wide as long not including rostrum; rostrum short, with three blunt, rounded spines on each side and straight tip; orbits situated at base of rostrum, weakly rimmed, with small outer orbital spine; anterolateral margin with broad swelling anterior to intersection of cervical groove with lateral margin of carapace; cervical groove and branchiocardiac grooves weak; lateral margin with four spines centrally; epibranchial region with four spines; carapace ornamented with short, weak, scabrous ridges. *Eocene* (*Priabonian*): Italy.——Fig. 11,*6*. **L. blowi,* holotype, MCZ 2226, scale bar 2 mm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Longoporcellana** Müller & Collins, 1991, p. 57 [**L. denticulata,* p. 57, pl. 2,*4–5;* OD]. Carapace ovate, longer than wide excluding rostrum, smooth; rostrum broad, with serrate tip; orbits oblique, rimmed; cervical groove weak, carapace without obvious ornamentation or regional development. *Eocene* (*Priabonian*): Hungary, Italy.——Fig. 11,*7*. **L. denticulata,* paratype, M.91.120B, Hungary, scale bar 2 mm (new, photo by M. Hyžný, Comenius University, Bratislava, Slovakia).

**Montemagrelisthes** De Angeli & Ceccon, 2017, p. 17 [**M. prealpinus,* p. 17, pl. 3,*3;* OD]. Carapace approximately as wide as long excluding rostrum;

rostrum long, axially sulcate, appearing to have sharp tip; lateral margins convex; mesogastric and cardiac regions strongly inflated; remainder of carapace ornamented with scattered tubercles. *Eocene* (*Ypresian*): Italy.——Fig. 11,*8*. **M. prealpinus,* holotype, MCV 16/I.G.371334, scale bar 2 mm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Pachycheles** Stimpson, 1858, p. 228 [**Porcellana grossimana* Guérin-Méneville, 1838, p. 8, pl. 26,*3;* OD] [=*Pisosoma* Stimpson, 1858, p. 228 (type, *Porcellana pisum* H. Milne Edwards, 1837 in 1834–1840, p. 254, OD)]. Carapace approximately as wide as long, parallel sided; rostrum short, very broad; orbits oblique; branchial regions with short transverse ridges laterally; chelipeds with strong tubercles on carpus and manus. *Eocene–Holocene. Eocene* (*Ypresian, Priabonian*): Italy. *Pliocene:* Costa Rica. *Pleistocene:* Japan. *Holocene:* Cosmopolitan.——Fig. 11,*9. P. rudis* Stimpson, 1862, USNM 1299245, Holocene, USA (California), scale bar 1 cm (new).

**Paraporcellana** Beschin, Busulini, Tessier, & Zorzin, 2016, p. 43 [**P. fabianii,* p. 44, pl. 4,*6–7;* OD]. Carapace rounded, approximately as long as wide excluding rostrum; rostrum axially sulcate, downturned, with notched tip; orbits positioned at base of rostrum, directed anterolaterally; cervical groove deep axially, disappearing laterally; short, transverse, scabrous ridges posteriorly on carapace. *Eocene* (*Ypresian*): Italy.——Fig. 12,*1*. **P. fabianii,* holotype, VR 93912, scale bar 2 mm (new, photo by A. Busulini, Museo di Storia naturale, Venezia, Italy).

**Petrolisthes** Stimpson, 1858, p. 227 [**Porcellana violacea* Guérin, 1831, p. 33, pl. 3,*2;* OD]. Carapace ovate; rostrum broadly, bluntly triangular; orbits shallow, oblique; carapace relatively unornamented, grooves weak. *Upper Cretaceous–Holocene. Upper Cretaceous* (*Santonian*): Canada (British Columbia). *Eocene* (*Ypresian, Priabonian*): Italy. *Oligocene* (*Rupelian*): Italy. *Miocene* (*Serravallian, Burdigalian–Langhian, Messinian*): Austria, Hungary, Japan, Malta, Poland, Ukraine. *Pliocene:* Costa Rica, Fiji; USA (Florida). *Pleistocene:* Mexico. *Holocene:* Indo-West Pacific Ocean, Australia.——Fig. 12,*2*. *Petrolisthes scabriculus* (Dana, 1852), MNHN-IU-2014-2229, Holocene, Indo-West Pacific Ocean, scale unknown (photo by T.Y. Chan & C.W. Lin, MNHN).

**Pisidia** Leach, 1820, p. 53 [**Cancer longicornis* Linnaeus, 1767, p. 1040; ICZN Opinion 701, 1964a] [=*Streptochirus* Stimpson, 1907, p. 188 (type, *Porcellana serratifrons* Stimpson, 1858, p. 229, SD Haig, 1960, p. 207)]. Carapace cordate; rostrum wide, short, with tiny spine axially; anterolateral margins with several spines spaced at varying intervals; carapace surface smooth; chelipeds very large compared to remainder of body. *Eocene:* Italy. *Miocene* (*Langhian, Messinian*): Austria, Greece, Hungary, Italy, Poland, Spain. *Holocene:* Indo-West Pacific Ocean, Australia, Atlantic Ocean.——Fig. 12,*3*. *Pisidia blutelli* (Risso, 1816), USNM 152180, Holocene, Mediterranean Sea, scale bar 2 mm (new).

**Polyonyx** Stimpson, 1858, p. 229 [**P. gibbesi* Haig, 1956, p. 28 *pro Porcellana macrocheles* Gibbes, 1850, p. 191; OD; *non Porcellana macrocheles* Poeppig, 1836, p. 142]. Carapace transversely ovate, wider than long; front wide, barely projected beyond orbits; orbits directed forward; anterolateral margin sinuous, short; posterolateral margin long, rounding into wide posterior margin; carapace surface smooth. *Eocene–Holocene. Eocene* (*Priabonian*): Hungary. *Pleistocene:* Japan. *Holocene:* North Atlantic Ocean, Indo-Pacific Ocean, Australia.——Fig. 12,*4*. **P. gibbesi,* USNM 55870, Holocene, Florida, scale bar 5 mm (new).

**Spathagalathea** De Angeli & Garassino, 2002, p. 16 [**S. minuta,* p. 17, fig. 13, pl. 4,*1–2;* OD]. Subsquare carapace, highly vaulted transversely; rostrum spatulate, with three spines and serrations between spines, lateral sides concave; orbits broad, with weak outer-orbital spines; carapace grooves absent; regions poorly defined; epigastric regions best defined of all carapace regions. *Eocene* (*Priabonian*): Italy.——Fig. 12,*5*. **S. minuta,* paratype MCZ 2191, scale bar 2 mm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Vibrissalana** Robins & Klompmaker, 2019, p. 1141 [**V. jurassica,* p. 1142, fig. 7; OD]. Carapace incomplete; excluding rostrum, appears ovate in shape, slightly wider than long, length/width of anterior margin 1.05; length/maximal width ~0.85; weakly convex transversely and longitudinally. Rostrum sulcate, with weak groove marking midline of rostrum; sides narrow distally. Cervical groove clearly defined, intersects lateral margin at almost 90° angle. Anterior part of lateral margin with tiny tubercles. Epigastric region weakly defined. Cardiac region weakly defined, appears slightly tumid. Ornamentation of gastric region composed of variously sized setal pits; pits largest in center of the gastric region. Posterior margin rimmed. [Emended from Robins & Klompmaker, 2019, p. 1141.] *Upper Jurassic* (*Tithonian*): Austria.——Fig. 12,*6*. **V. jurassica,* holotype, NHMW 2007z0149/0405, scale bar 2 mm (new).

## Superfamily HIPPOIDEA Latreille, 1825

[*nom. transl.* Hippides Latreille, 1825, p. 275; ICZN Opinion 643, 1963]

Carapace longer than wide or as long as wide, symmetrical, ovate to rectangular; lateral margins straight or convex, commonly with spines; carapace smooth, with transverse ridges or grooves or setae; telson entire, uropods not forming a tailfan; eyes variable, may be flattened or elongate,

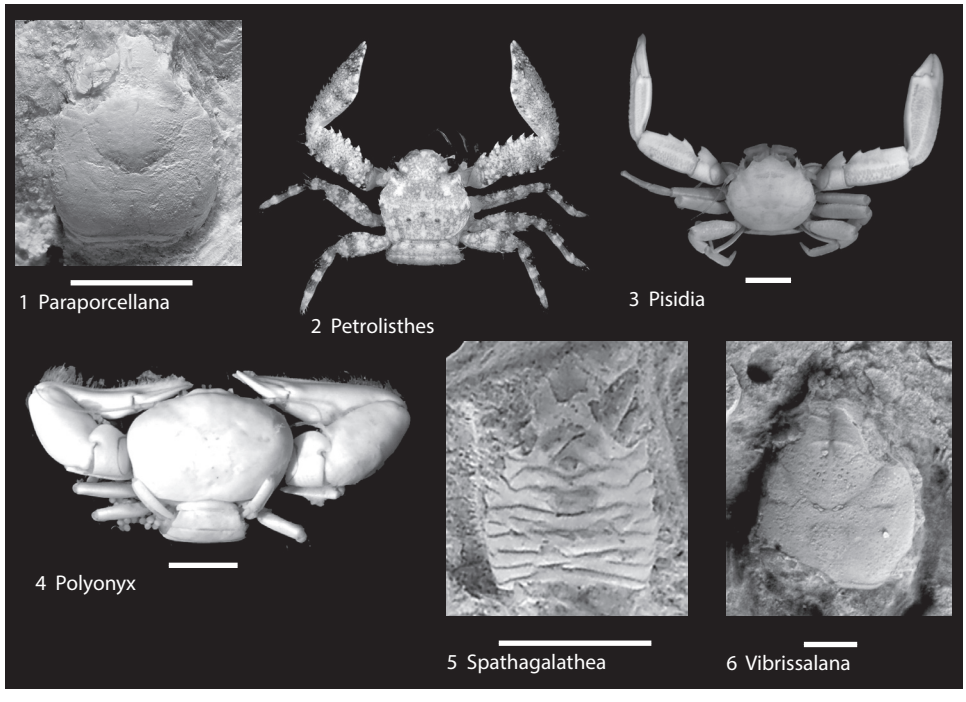


FIG 12. Porcellanidae (p. 21).

ocular scales absent; pereiopods subchelate or achelate; pereiopods 2–4 with similar, flattened dactyli. [Emended from BOYKO & MCLAUGHLIN, 2010, p. 139.] *Upper Cretaceous* (*Maastrichtian*)–*Holocene*.

## Family ALBUNEIDAE Stimpson, 1858

[*nom. correct.* MIERS, 1879, p. 326, *pro* Albunidae STIMPSON, 1858, p. 230]

Carapace subquadrate to ovate, without lateral expansions covering pereiopods, setal field just posterior to frontal margin, numerous setose grooves, groove pattern complex, with up to 11 grooves, many composed of short, discontinuous segments; rostrum small or absent; epibranchial spine absent; antennule composed of three segments; antenna composed of five segments, acicle present; first pereiopod subchelate; dactyli of pereiopods 2–4 sickle-shaped; pereiopod 5 reduced, chelate; pleon with pleurae on somites 2–4 or 5. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 311.] *Upper Cretaceous* (*Maastrichtian*)–*Holocene*.

### Subfamily ALBUNEINAE Stimpson, 1858

[*nom. transl.* BOYKO, 2002, p. 180, *ex* Albunidae STIMPSON, 1858, p. 230]

Outer-orbital spines absent; antenna acicle present, long; maxilliped 2 with flagellum; maxilliped 3 *crista dentata* absent or weak; dactylus of pereiopod 1 with smooth or crenulate dorsal margin; pleon with pleurae on somites 2–4. [Emended from BOYKO, 2002, p. 180.] *Upper Cretaceous* (*Maastrichtian*)–*Holocene*.

**Albunea** WEBER, 1795, p. 94 [**Cancer symmysta* LINNAEUS, 1758, p. 630; SD HOLTHUIS, 1956, p. 237, ICZN Opinion 522, 1958] [=*Symnista* RAFINESQUE, 1815, p. 98, unnecessary replacement name] [=*Mioranina* MÜLLER, 1978, p. 278 (type, *M. asymmetrica,* p. 278, pl. 9–10]. Carapace longer than wide, wide anteriorly and narrowing markedly posteriorly; anterior margin spinose, ocular sinus concave, rostrum tiny; cervical groove weak (CG6 of BOYKO, 2002); carapace ornamented with discontinuous, transverse serrate ridges; setal field well defined; anterolateral margins straight and parallel anteriorly, converging axially posteriorly; posterior margin bilobed, deeply concave axially; first pereiopod chelate; telson sexually dimorphic.

*Eocene–Holocene. Eocene* (*Lutetian*): Italy. *Eocene* (*Lutetian–Bartonian*): USA (South Carolina). *Miocene* (*Burdigalian*): France. *Miocene* (*Messinian*): Hungary. *Holocene:* Tropical and subtropical.——Fig. 13,*1*. **A. symnista* (Linnaeus), USNM 68613, Holocene, Philippines, scale bar 1 cm (new).

**Italialbunea** Boyko, 2002, p. 221 [**Albunea lutetiana* Beschin, & De Angeli, 1984, pl. 1,*2,* pl. 2,*2;* OD]. Carapace approximately as wide as long, anterior margin narrow for family, ocular sinus weakly concave; carapace grooves deep, carapace groove 1 (terminology of Boyko, 2002) entire, carapace grooves 6 and 7 fused, carapace grooves 5 and 11 absent; remainder of grooves (2, 3, 4, 8, 9, 10) weak; carapace between grooves with short, scabrous ridges; posterior margin strongly bilobed; dactylus of first pereiopod smooth. [Emended from Boyko, 2002, p. 221.] *Eocene* (*Lutetian*): Italy.——Fig. 13,*3*. **I. lutetiana* (Beschin, & De Angeli), holotype, MSNV 1044, scale bar 1 cm (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Praealbunea** Fraaije, 2002, p. 69 [**P. rickorum,* p. 69, fig. 1–2; OD]. Carapace longer than wide, ornamented with transverse ridges; setal field small; ocular sinus concave, with small triangular rostrum; long, sharp outer-orbital spines; remainder of frontal margin entire; carapace grooves 1, 2, 3, and 4 well defined, remainder of carapace grooves absent or poorly defined. *Upper Cretaceous* (*Maastrichtian*): The Netherlands.——Fig. 13,*4*. **P. rickorum,* holotype, MAB k.1031, scale bar 1 cm (new; photo by R.H.B. Fraaije, Oertijdmuseum, Boxtel, The Netherlands).

**Sklallamia** Goedert & Berglund, 2012, p. 253 [**S. buchanani,* p. 254, fig. 1–2; OD]. Carapace rounded, approximately as wide as long, frontal margin narrow, with tiny rostrum, blunt spine on outer margin of ocular sinus; lateral margins convex; carapace grooves 1, 3–8 present; carapace surface smooth; posterior margin axially concave. *Eocene* (*Ypresian*): USA (Washington).——Fig. 13,*5*. **S. buchanani,* holotype, UWBM 98819, scale bar 1 cm (new, photo by J. Goedert, University of Washington, Seattle, WA, USA).

**Stemonopa** Efford & Haig, 1968, p. 908 [**S. insignis,* p. 908, fig. 8–10; OD]. Carapace as long as wide; anterior margin broad, with tiny spines, ocular sinus concave, rostrum absent; carapace grooves 5 and 11 absent, carapace relatively smooth. *Eocene* (*Lutetian*): Italy. *Holocene*: western Australia.——Fig. 13,*6*. *Stemonopa prisca* De Angeli, Beschin, & Checchi, 2005, holotype, MCZ 2404, Eocene, Italy, scale unknown (new, photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Zygopa** Holthuis, 1961, p. 21 [**Z. michaelis,* p. 22, fig. 1–2; OD]. Carapace wider than long, lateral margins convex, anterior margin narrow for family, without spines; rostrum absent; ocular sinus very shallowly concave; carapace with two lateral spines; carapace surface relatively unornamented; carapace grooves faint, reduced, or absent; pleon without pleura on fifth somites, telson sexually dimorphic. *Oligocene–Holocene. Oligocene* (*Rupelian*): Italy. *Holocene:* Caribbean Sea, USA (Florida), western Pacific Ocean.——Fig. 13,*7*. **Z. michaelis,* USNM 122644, Holocene, Florida, scale bar 1 cm (new).

## Subfamily LEPIDOPINAE Boyko, 2002

[Lepidopinae Boyko, 2002, p. 56]

Carapace front broad, unarmed or weakly toothed; outer-orbital spines usually present; anterolateral spine present; rostrum present; cornea absent; antenna acicle present, short; maxilliped 3 carpal projection long; pereiopod 1 dactylus with smooth dorsal margin; pleon with pleurae on somites 2–5. [Emended from Boyko, 2002, p. 56.] *Holocene*.

**Lepidopa** Stimpson, 1858, p. 230 [**L. venusta* Stimpson, 1859, p. 79; SD; ICZN Opinion 693 1964b] [=*Lepidops* Stimpson, 1860, p. 241, incorrect spelling, ICZN Opinion 693, 1963; =*Lepidops* Miers, 1878, p. 331, unjustified emendation, ICZN Opinion 693, 1963]. Carapace unarmed or weakly spinose; rostrum narrow, rounded; antenna with more than three flagellar articles; pereiopod 4 merus with decalcified lateral surface; pleonal somite 5 with weakly calcified. *Holocene*: western Atlantic, Caribbean Sea; eastern Pacific Ocean.——Fig. 13,*2*. *Lepidopa benedicti* Schmitt, 1935, Holocene, Mississippi, USA, scale unknown (image from iNaturalist, in the public domain, from STRI [ivertebase.org/stri]).

## Family BLEPHARIPODIDAE Boyko, 2002

[Blepharipodidae Boyko, 2002, p. 10]

Carapace longer than wide, broadly axially keeled; frontal margin narrow, ocular sinus deeply sulcate, with tiny spines; rostrum short, spinose; outer-orbital spines long; carapace grooves 4, 6, and 8 deep and well defined, 4 and 6 defined as a triangular region at approximately midlength of carapace; setal field well developed; lateral margins weakly convex, with spines which may be long; posterior margin narrow, biconvex. *Eocene* (*Priabonian*)*–Holocene*.

**Blepharipoda** Randall, 1840, p. 130 [**B. occidentalis,* p. 131, pl. 6; M] [=*Albunhippa* H. Milne Edwards & Lucas, 1841, p. 474 (type, *A. spinosa*, p. 477, pl. 28,*1–13;* M); =*Abrote* Philippi, 1857, p. 124 (type, *A. spinimana,* p. 129, pl. 8, M)]. Carapace elongate, widened medially; outer ocular spines triangular; two hepatic anterolateral spines; anterior gastric spine usually present; dactyl and carpus of pereiopod 1spinose [Emended from Boyko, 2002, p. 26.] *Pleistocene–Holocene.*

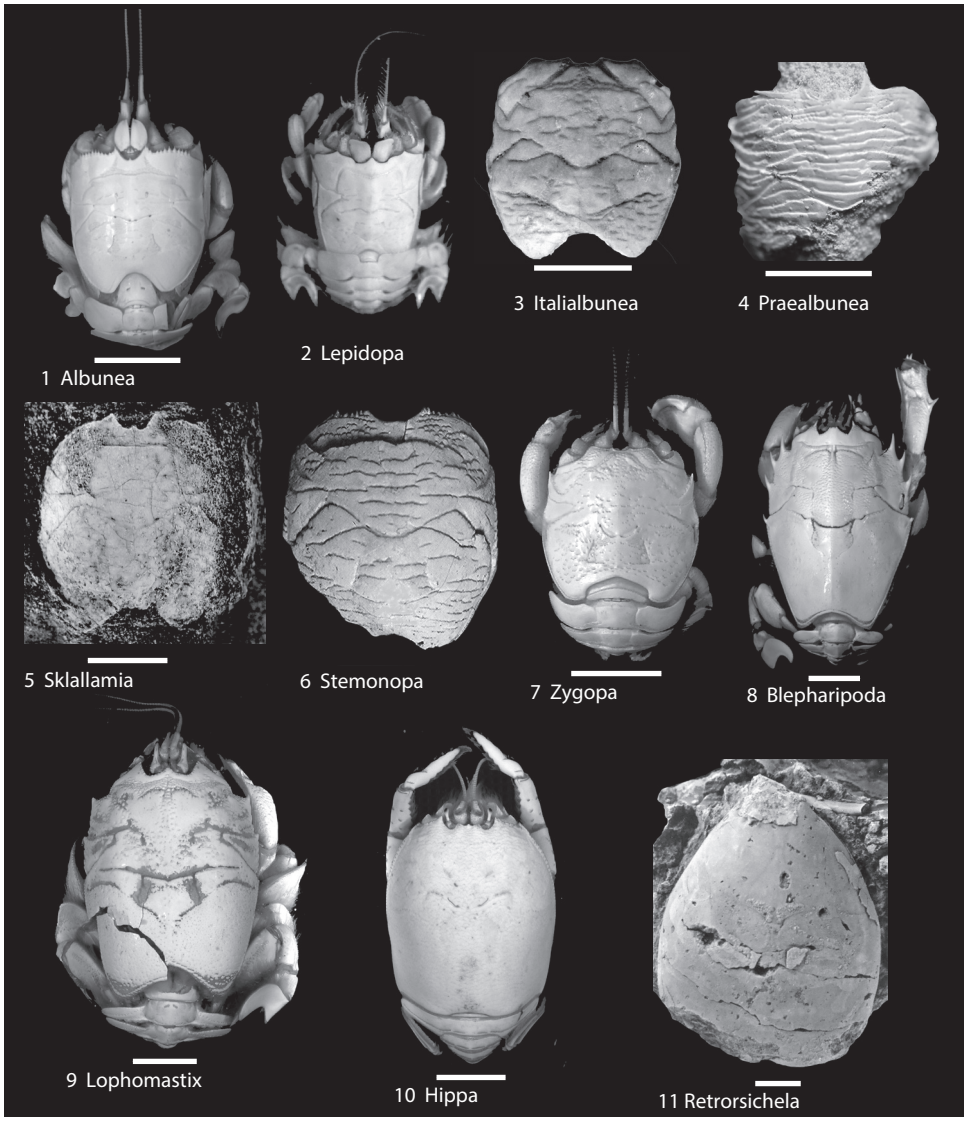


FIG 13. Albuneidae, (Albuneinae, Lepidopinae), Blepharipodidae, Retrorsichelidae, Hippidae (p. 22–25).

*Pleistocene:* Japan. *Holocene:* Pacific rim, southwestern Atlantic Ocean.——FIG. 13,*8. *B. occidentalis,* USNM 89482, Holocene, California, USA, scale bar 1 cm (new)

**Lophomastix** BENEDICT, 1904, p. 621 [**L. diomedeae,* p. 621, fig. 1; OD]. Carapace much longer than wide, broadly arched axially; outer-orbital spines long, triangular, serrate; rostrum triangular, ornamented with small spines; ocular hiatuses deeply concave, ornamented with small spines; anterior gastric spine absent; anterolateral margin with two spines: one hepatic and one epibranchial; branchial region with numerous punctae or transverse grooves; dactylus of cheliped unarmed or with low teeth, not spinose; propodus of cheliped with single ventrolateral spine. [Emended from SCHWEITZER & BOYKO, 2000, p. 631.] *Eocene–Holocene. Eocene* (*Priabonian*)–*Oligocene* (*Rupelian*): USA (Washington). *Holocene:* western and eastern Pacific Ocean.——FIG. 13,*9. Lophomastix japonica* (DURUFLÉ, 1889), USNM 104659, Holocene, Japan, scale bar 1 cm (new).

### Family HIPPIDAE Latreille, 1825

[*nom. correct*. Hippides Latreille, 1825, p. 275; ICZN Opinion 643, 1963]

Carapace ovate, longer than wide, convex, without particular ornamentation, lateral margins entire; rostrum small or absent; lateral extensions cover all except pereiopod 1; mandible reduced; pereiopod 1 achelate; pereiopods 2 and 3 with curved, flattened dactyli; telson elongate, lanceolate, with sharp tip. [Emended from Tudge, Asakura, & Ahyong, 2012, p. 312.] *Holocene*.

**Hippa** Fabricius, 1787, p. 329 [**Hippa adactyla,* p. 329; SD Rathbun, 1900, p. 301, ICZN Opinion 643, 1963] [=*Remipes* Latreille, 1804, p. 126 (type *R. testudinarius,* Latreille, 1806, p. 45, M)]. Frontal margin with one broad median lobe or two to three median lobes; outer-ocular spines blunt; posterior margin wide, axially shallowly concave, cervical groove marked; setal pits parallel lateral margins; antennae short. *Holocene:* Indo-Pacific Ocean, eastern Pacific Ocean, Atlantic Ocean.——Fig. 13*,10*. **H. adactyla,* USNM 304301, Holocene, Philippines, scale bar 1 cm (new).

## SUPERFAMILY UNCERTAIN

### Family RETRORSICHELIDAE Feldmann, Tshudy, & Thomson, 1993

[Retrorsichelidae Feldmann, Tshudy, & Thomson, 1993, p. 27]

Carapace ovate, smooth, without regional differentiation; rostrum triangular; abdomen well calcified, somite 1 dorsal, remaining somites carried ventrally; sternites 1–3 fused, remaining sternites deeply divided axially; first pereiopod strongly chelate, carried under carapace; last large pereiopod (4?) with large, paddle-like dactylus. *Upper Cretaceous* (?*Late Santonian–Campanian*).

**Retrorsichela** Feldmann, Tshudy, & Thomson, 1993, p. 27 [**R. laevis,* p. 27, fig. 19–20; OD]. As for family. *Upper Cretaceous*: (?*Late Santonian–Campanian*): Antarctica.——Fig. 13*,11*. **R. laevis,* holotype, BAS In.2215, scale bar 1 cm (new).

## ACKNOWLEDGMENTS

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## ABBREVIATIONS FOR MUSEUM REPOSITORIES

**BAS:** British Antarctic Survey, Cambridge, UK

**BSP:** Bayerische Staatsammlung für Paläontologie und historische Geologie München (Munich), Germany

**E, EK, M, HNHM:** Hungarian Natural History Museum, Budapest, Hungary

**EGR:** Paleontological collection, Escola de Geologia do Recife, Pernambuco, Brazil

**GPIBo:** Steinmann-Institut für Geologie, Mineralogie und Paläontologie, Universität Bonn, Germany

**IGM:** Museo de Paleontologia, Instituto de Geologia, Universidad Nacional Autonoma de Mexico

**IRScNB:** Institut Royal des Sciences Naturelles de Belgique, Paleontology Collections, Brussels, Belgium

**KSU D:** Decapod Comparative Collection, Department of Geology, Kent State University, Kent, Ohio, USA

**MAB k:** Oertijdmuseum, Boxtel, The Netherlands

**MCV:** Museo Civico "D. Dal Lago" di Valdagno, Vicenza, Italy

**MCZ:** Museo Civico "G. Zannato" di Montecchio Maggiore, Vicenza, Italy

**MFM:** Mizunami Fossil Museum, Mizunami, Gifu, Japan

**MFSN:** Museo Friulano di Storia Naturale, Udine, Italy

**MGSB:** Museo Geológico del Seminario de Barcelona, Barcelona, Spain

**MGUH:** Geological Museum, University of Copenhagen, Denmark

**MHNG GEPI:** Department of Geology and Paleontology, Natural History Museum, Geneva, Switzerland

**MNHN.F:** Muséum National d'histoire naturelle, Paris, Collection de Paléontologie, France

**MNHN IU:** Muséum National d'histoire naturelle, Paris, Crustacean Collection, France

**MSNM:** Museo Civico di Storia Naturale di Milano, Italy

**MSNV:** Museo di Storia Naturale di Venezia, Italy.

**NHMUK:** Palaeontology Collections, The Natural History Museum, London, UK

**NHMW:** Naturhistorisches Museum Wien (Natural History Museum of Vienna), Austria

**NRM-PZ:** Palaeozoological Collections, Swedish Museum of Natural History, Stockholm, Sweden

**NZGS AR:** New Zealand Geological Survey, Lower Hutt, New Zealand

**UAM:** University of Alaska Museum, Fairbanks, Alaska, USA

**USNM:** United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA

**UWBM:** Burke Museum, University of Washington, Seattle, Washington, USA

**VR:** Museo di Storia naturale di Verona, Italy

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