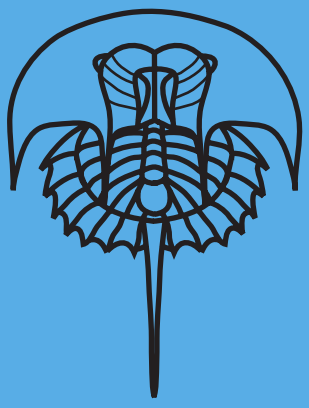

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Part R, Revised, Volume 1, Chapter 8T19: Systematic Descriptions: Superfamily Goneplacoidea

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PART R, REVISED, VOLUME 1, CHAPTER 8T19: SYSTEMATIC DESCRIPTIONS: SUPERFAMILY GONEPLACOIDEA

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Superfamily GONEPLACOIDEA MacLeay, 1838

[*nom transl.* d'Udekem d'Acoz, 1999, p. 241, *ex* Gonoplacidae MacLeay, 1838, p. 64]

Carapace transversely rectangular, ovate, or trapezoidal; generally flattened transversely and longitudinally; dorsal carapace regions weakly defined or indistinct; front weakly protruded, straight, may have median notch or projection, usually narrow; upper orbital margin with or without fissures, fronto-orbital width typically very broad but orbits may be short; buccal frame quadrangular; anterolateral margin may be entire or spined, sometimes merging with and indistinct from posterolateral margin; sternite 4 without medial sulcus; sternites 4/5, 5/6, 6/7, and 7/8 exhibiting astonishing combination of interrupted or complete; well-developed posterolateral prolongation of male episternite 7, sternite 8 usually not visible in ventral or posterior view; male pleonal somites free or 3–5 fused and immovable, sutures may still be evident; male pleon may or may not fill entire space between coxae of fifth pereiopods; chelipeds usually heterochelous, usually without dark-colored fingers; absence of corneous tips on pereiopods 2–5, pereiopods 2–5 generally much less robust than chelipeds; male gonopod 1 stout or slender, sinuous, or curved, usually with a simple apex; gonopod 2 long or short. [Emended from Karasawa & Kato, 2003, p. 137; Karasawa & Schweitzer, 2006, p. 55; Castro, Guinot, & Ng, 2010, p. 37.] *Upper Cretaceous* (*Campanian*)*–Holocene*.

Family ACIDOPSIDAE Števčič, 2005

[*nom. correct.* Ng, Guinot, & Davie, 2008, p. 75, *pro* Acidopidae Števčič, 2005, p. 36] [=Parapilumnidae Števčič, 2005, p. 70; =Raouliidae Števčič, 2005, p. 71; =Typhlocarcinoididae Števčič, 2005, p. 62; =Caecopilumnidae Števčič, 2011, p. 127]

Carapace wider than long, subcircular, vaulted longitudinally, regions moderately defined; orbits and eyestalks long; anterolateral margin short, with three or four spines; basal antennal article fills orbital hiatus; sternum narrow, sutures 4/5 to 7/8 complete; male sterno-pleonal cavity reaching to posterior end of sternite 4; male gonopod 1 nearly straight, tapering distally; male gonopod 2 as long as 1, with long flagellum; male pleon filling nearly entire space between coxae of fifth pereiopods, somites 3–5 fused, sutures visible laterally. [Emended from Davie, Guinot, & Ng, 2015, p. 1082.] *Holocene*.

Acidops Stimpson, 1871b, p. 110 [**A. fimbriatus,* p. 111; M] [=*Epimelus* A. Milne-Edwards, 1878, p. 227 (type, *E. cessacii,* M)]. Carapace regions defined by grooves; anterolateral margin with four lobes or spines; both carapace and pereiopods covered with dense setae. [Emended from Ng, Guinot, & Davie, 2008, p. 75.] *Holocene:* western coastal Mexico, northern South America, West Africa, Ascension Island.——Fig. 1,*1. Acidops cessacii* (A. Milne-Edwards, 1878), USNM 252238, Holocene, South Atlantic Ocean, scale bar, 1 cm (new).

Family CARINOCARCINOIDIDAE Karasawa & Kato, 2003

[*nom. transl.* Karasawa & Schweitzer, 2006, p. 56, *ex* Carinocarcinoidinae Karasawa & Kato, 2003, p. 142]

Schweitzer, C. E., R. M. Feldmann, & Hiroaki Karasawa. 2022. Part R, Revised, Volume 1, Chapter 8T19: Systematic descriptions: Superfamily Goneplacoidea. Treatise Online 164:1–22, 7 fig.

Carapace wider than long, length ranging from 70–90 percent maximum carapace width, widest at position of last anterolateral spine or just anterior to it, 40–50 percent the distance posteriorly on carapace; dorsal carapace with more or less defined dorsal regions, epibranchial regions and sometimes other regions transversely inflated to form carinae; front straight, without median notch, between one-quarter and one-third maximum carapace width; notch between frontal margin and supraorbital angle indistinct; upper orbital margin without fissures, fronto-orbital width between two-thirds and three-quarters maximum carapace width; anterolateral margin with two spines excluding outer-orbital spine; merus of maxilliped 3 subquadrate, much longer than ischium; male pleon filling entire space between coxae of pereiopods 5, with somites 3–5 fused; thoracic sternum wide; sternal sutures 4/5, 5/6, and 6/7 apparently interrupted; sternite 7 with posterolateral prolongation; sternite 8 visible in ventral view, overlying posterior portion of sternite 7; sterno-pleonal cavity reaching anterior of sternite 4; fingers of chelipeds long, elongate, not dark in color. [Emended from Glaessner & Secretan, 1987, p. 279; Karasawa & Kato, 2003, p. 142; Karasawa & Schweitzer, 2006, p. 56.] *Eocene* (*Lutetian*)*–Miocene*.

Bicarinocarcinus Glaessner & Secretan, 1987, p. 278 [**B. collinsi*, p. 278, pl. 1,*2–4;* M]. Carapace wider than long, rectangular; fronto-orbital width occupying 80% maximum carapace width; lateral margins convex, with inflection where intersected by medial transverse ridge; carapace regions poorly defined; one strong keel extending transversely across carapace from lateral margins, across epibranchial and mesogastric region; second shorter transverse keel on cardiac region; sternum broadly triangular; sterno-pleonal cavity deep. *Eocene–Miocene. Eocene* (*Bartonian*): Pakistan. *Miocene*?: Sabah, Sarawak.——Fig. 1,*2*. **B. collinsi,* KSU D 30, cast of MNHN.F R55072, Eocene, Pakistan, scale bar, 5 mm (new).

Carinocarcinoides Karasawa & Fudouji, 2000, p. 246 [**C. carinatus,* p. 247, fig. 5,*1*, 5,*2*, 5,*4;* OD]. Carapace transversely hexagonal to roundly quadrate, widest at anterolateral angle; front nearly straight; upper orbital margin without fissures; anterolateral margin strongly convex with three small, anterolaterally directed spines; dorsal surface smooth, moderately vaulted transversely and weakly vaulted longitudinally; regions distinct; protogastric, cardiac and epigastric ridges present; anterior mesogastric process poorly defined; cervical and branchiocardiac grooves well defined; thoracic sternum narrow, longer than wide; chelipeds large, subequal. *Oligocene* (*Rupelian*): Japan.——Fig. 1,*3*. **C. carinatus,* holotype MFM 218153, scale bar, 1 cm (new).

Family CHASMOCARCINIDAE Serène, 1964

[*nom. transl.* Števčič, 2005, p. 107, *ex* Chasmocarcininae Serène, 1964, p. 185]

Carapace rectangular or trapezoidal, wider than long, length ranges from 70–85 percent maximum carapace width; front flared or bilobed, with medial notch; orbits with sinuous, entire upper margins, short; fronto-orbital width occupying entire or nearly entire frontal margin, averaging half maximum carapace width; posterolateral reentrants well developed if present; fronto-orbital width to posterior width ratio of approximately 1.0; basal article of antennules swollen, completely filling antennular fossa, flagellum excluded; pereiopods long, narrow; sternum wide, all sutures interrupted axially, sterno-pleonal cavity reaching middle of sternite 4, sternite 8 visible in ventral view, overlying portion of sternite 7; open groove between sternites 7 and 8 covered by supplementary plate; sternal sutures 4/5, 5/6, 6/7, and 7/8 interrupted; pleonal somites 3–5 typically in males but sutures may be visible; male gonopod 1 with simple termination. [Emended from Karasawa & Schweitzer, 2006, p. 56; Ng & Castro, 2016, p. 7.] *Eocene* (*Lutetian*)*–Holocene.*

Subfamily CHASMOCARCININAE Serène, 1964

[Chasmocarcininae Serène, 1964, p. 185]

Carapace rectangular or trapezoidal, wider than long, length ranges from 70–85 percent maximum carapace width; front flared or bilobed, with medial notch; orbits with sinuous, entire upper margins, short; fronto-orbital width occupying entire or nearly

entire frontal margin, approximately half maximum carapace width; posterolateral reentrants well developed if present; fronto-orbital width to posterior width ratio usually equal; basal article of antennules swollen, completely filling antennular fossa, flagellum excluded; pereiopods long, narrow; sternum wide, all sutures interrupted axially, sternopleonal cavity reaching middle of sternite 4, sternite 8 visible in ventral view, overlying portion of sternite 7; open groove between sternites 7 and 8 covered by supplementary plate or may be open; sternal sutures 4/5, 5/6, 6/7, and 7/8 interrupted; pleonal somites 3–5 fused in males but sutures may be visible; male gonopod 1 with simple termination; chelipeds nearly equal in size. [Emended from Karasawa & Schweitzer, 2006, p. 56; Ng & Castro, 2016, p. 7.] *Eocene* (*Lutetian*)–*Holocene*.

Chasmocarcinus Rathbun, 1898, p. 284 [**C. typicus,* p. 285, pl. 7,*3–5;* OD]. Carapace wider than long, narrowest anteriorly, widest at position of posterolateral flange; front not extending much beyond orbits; orbits rectangular, rimmed, shallow, directed forward, upper margin sinuous; fronto-orbital width approximately half maximum carapace width and 1.2 times posterior width; orbits entirely or nearly entirely occupying straight frontal margin; anterolateral and posterolateral margins indistinguishable, weak ridge parallel to anterior portion of lateral margin; laterally directed flange just anterior to posterolateral corner; posterior margin sinuous, rimmed; sternites with small episternal projections; genital groove in males covered by supplementary sternal plate. [Emended from Schweitzer & Feldmann, 2001, p. 338.] *Eocene–Holocene. Eocene* (*Lutetian*): Spain. *Eocene:* Antarctica (Peninsular). *Miocene* (*Tortonian*): USA (Virginia). *Miocene:* Chile. *Holocene:* Caribbean Sea, northern South America, west coastal Central and northern South America.——Fig. 1,*4. C. seymourensis* Feldmann & Zinsmeister, 1984, holotype USNM Pal 365455, Eocene, Antarctica, scale bar, 1 cm (new).

Collinsius Karasawa, 1993, p. 72 [**C. simplex,* p. 73, pl. 21,*3–8;* OD]. Carapace rectangular, wider than long, widest two-thirds the distance posteriorly on carapace; front not deflexed, extending well beyond orbits; orbits with sinuous upper margin, wide directed forward; posterolateral reentrants absent; posterior margin sinuous; axial regions well defined, especially urogastric and cardiac. [Emended from Schweitzer & Feldmann, 2001, p. 338.] *Oligocene:* Japan.——Fig. 1,*5.* **C. simplex*, holotype MFM 218502, scale bar, 1 cm (new).

Falconoplax Van Straelen, 1933, p. 11 [**F. kugleri,* p. 11, fig. 6; M]. Carapace trapezoidal, widest just anterior to posterolateral reentrant; front not extending beyond orbits; orbits with straight upper margins, directed axially, deepest point of orbits adjacent to front; fronto-orbital width averaging three-quarters posterior width; fronto-orbital width occupying entire frontal margin of carapace; posterolateral reentrants small; posterior margin nearly straight; posterior width about half maximum carapace width; regions moderately developed; epibranchial ridge directed posteromesially from lateral margin; sometimes with strong transverse protogastric-hepatic ridge and longitudinal branchial ridge; male genital groove exposed, wide, developed in sternite 8. *Eocene–Miocene. Eocene:* Barbados, Trinidad, Venezuela. *Miocene:* Trinidad, Venezuela.——Fig. 1,*6.* **F. kugleri,* KSU D 118 of MBA locality 2632a, Miocene, Venezuela, scale bar, 1 cm (new).

Gillcarcinus Collins & Morris, 1978, p. 967 [**G. amphora,* p. 967, pl. 117,*2–4;* OD]. Carapace rectangular, length ~65% maximum carapace width; orbits square, directed forward; fronto-orbital width ~40% maximum carapace width; posterior width nearly equal to fronto-orbital width; carapace width distinctive, granular, arcuate ridge extending from branchial region across hepatic, protogastric, mesogastric region and terminating at opposite branchial region; cardiac region with transverse ridge. [Emended from Schweitzer, Feldman, & Gingerich, 2004, p. 104.] *Eocene* (*Lutetian*): Pakistan.——Fig. 1,*7.* **G. amphora,* KSU D 303, cast of GSP-UM 3500, scale bar, 1 cm (new).

Mioplax Bittner, 1884, p. 23 [**M. socialis,* p. 23, pl. 2,*3;* M]. Carapace square, slightly wider than long; front straight; orbits forward directed, followed by a short, straight segment and a sharp spine at anterior corner; lateral margins parallel, with large posterolateral reentrant; posterior margin straight; carapace with poorly defined regions and scattered granules; chelipeds subequal. *Miocene* (*Serravallian–Tortonian*): Austria, Croatia.——Fig. 1,*8.* **M. socialis,* GBA 1884/003/0003/01, Miocene, Austria, scale bar, 1 cm (new; photo by M. Hyžný, Comenius University, Bratislava, Slovakia).

Orthakrolophos Schweitzer & Feldmann, 2001, p. 339 [**Palaeograpsus depressus* Quayle & Collins, 1981, p. 755, pl. 105,*11–13;* OD]. Carapace trapezoidal, widest just anterior to posterolateral reentrants; front not extending beyond orbits; fronto-orbital width occupying entire frontal margin; orbits broad, rimmed, sinuous; posterolateral reentrants large, with beaded rim; posterior margin half maximum carapace width; posterior width ~93% fronto-orbital width; carapace regions not well developed; cardiac region with transverse ridge; branchial regions with two transverse ridges on level with cardiac ridge and posterolateral reentrant respectively; sometimes with epibranchial transverse ridges. [Emended from Schweitzer & Feldmann, 2001, p. 339.] *Eocene–Pliocene. Eocene*

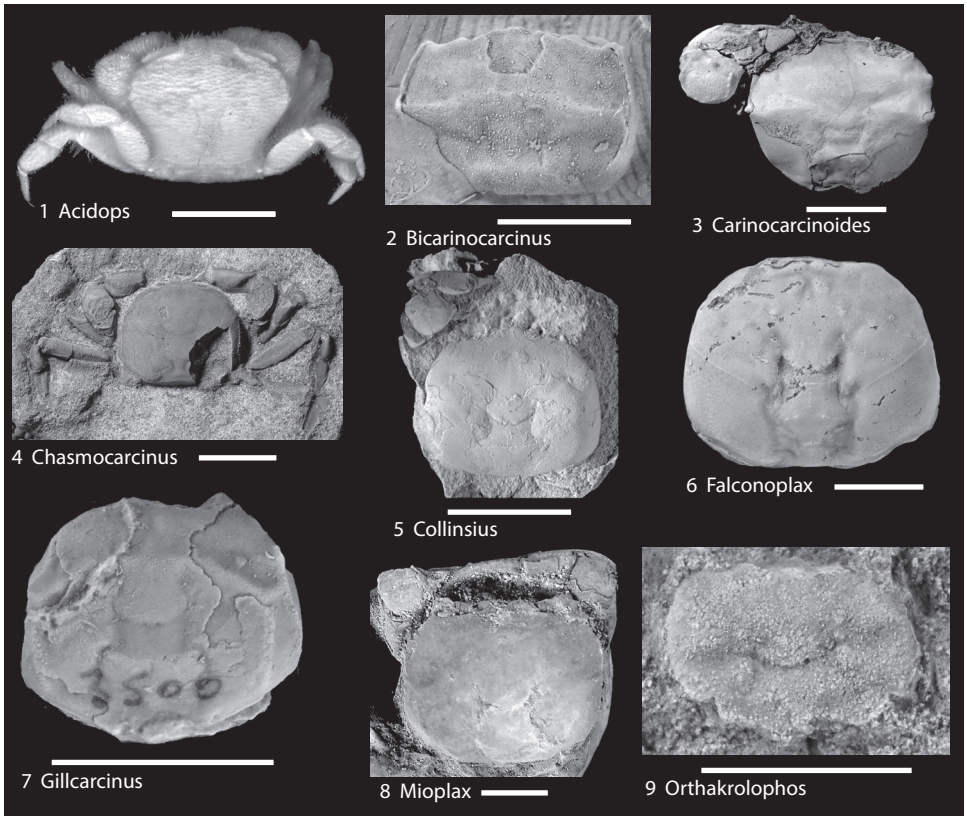

FIG 1. Acidopsidae, Carinocarcinoididae, Chasmocarcinidae (p. 1–4).

(*Lutetian*): UK (England). *Miocene:* Sabah. *Pliocene:* Brunei.——FIG. 1,*9*. **O. depressus* (QUAYLE & COLLINS), KSU 1487, Lutetian, UK (England), scale bar, 1 cm (new).

Subfamily MEGAESTHESIINAE Števčić, 2005

[Megaesthesiinae ŠTEVČIČ, 2005, p. 108]

Carapace rectangular, wider than long, very small; front narrow, downturned; fronto-orbital width occupying entire frontal margin, eyestalks long; basal article of antennules swollen, completely filling antennular fossa, last two segments of peduncle movable; pleonal somites 3–5 fused in males; male gonopod 1 with bidentate termination. [Emended from NG & CASTRO, 2016, p. 87.] *Holocene*.

No fossil representatives.

Megaesthesius RATHBUN, 1909, p. 112 [**M. sagedae;* M]. Antennular peduncle very large; eye peduncle large; male gonopod 2 longer than G1. *Holocene:* Indo-Pacific, Australia.——FIG. 2,*1*. **M. sagedae,* Holocene, Thailand, scale bar, 5 mm (RATHBUN, 1910, p. 344, fig. 30).

Subfamily TROGLOPLACINAE Guinot, 1986

[Trogloplacinae GUINOT, 1986, p. 307]

Carapace rounded, regions poorly defined; front straight with shallow medial notch, notch between front and supraorbital angle not apparent; upper orbital margin entire; anterolateral margin cristate, entire, or with spines; eyestalks short, eyes small; antennules folded completely into fosset; antenna placed in orbital hiatus; buccal frame quadrate, merus of third maxilliped suboval, nearly equal in length to ischium. Sternum very wide, all sternal sutures interrupted, sternite 8 clearly visible in ventral view; supplementary plate between sternites 7 and

8 covering penis; sterno-pleonal cavity deep; male pleonal somites 3–5 fused; gonopores of females large, on extremity of sternal suture 5/6; male gonopod 1 stout, sinuous, with simple apex; male gonopod 2 as long as or longer than gonopod 1, flagellum half as long as or slightly more than half its length; fingers of chelae sometimes elongate and deflexed; dactyls of pereiopods 2–5 styliform with seta. [Emended from Davie, 2002, p. 503; Karasawa & Kato, 2003, p. 142; Karasawa & Schweitzer, 2006, p. 58.] *Holocene*.

No fossil representatives.

Trogloplax Guinot, 1986, p. 308 [**T. joliveti,* p. 308, pl. 1–2; OD]. Eyes reduced, not pigmented; inhabits caves. *Holocene:* Indo-Pacific Ocean.——Fig. 2,*2*. **T. joliveti,* holotype MNHN-IU-2014-10457, Holocene, Papua New Guinea, scale bar, 1 cm (photo by N. Mollaret, MNHN, Project Recolnat [ANR-11-INBS-0004]).

Family CONLEYIDAE Števčić, 2005

[Conleyidae Števčić, 2005, p. 70]

Carapace ovate, wider than long, regions weakly defined, epibranchial region arcuate; front wide, orbits short; anterolateral margin with two weak spines; sternal sutures 1/2 through 3/4 entire, 4/5 through 7/8 interrupted; all male pleonal somites free; male sternite 8 covered by pleon; male gonopod 1 stout; male gonopod 2 long. *Holocene*.

No fossil representatives.

Conleyus Ng & Ng, 2003, p. 431 [**C. defodio,* p. 432, fig. 1–5; OD]. As for family. *Holocene:* Guam.——Fig. 2,*3*. **C. defodio,* holotype, UF 2098, scale bar, 1 cm (new; photo P. K. L. Ng, National University of Singapore).

Family EURYPLACIDAE Stimpson, 1871

[*nom. transl.* d'Udekem d'Acoz, 1999, p. 241, *ex* Euryplacinae Stimpson, 1871a, p. 150] [=Systroplacini Števčić, 2013, p. 188]

Carapace subquadrilateral, rectangular, or trapezoidal, wider than long, length usually approximately 80 percent maximum width; regions poorly defined; front generally straight with axial notch, from one-quarter to one half maximum carapace width but usually approximately one-third; orbits generally large, with orbital fissures, orbits open or closed due to a variety of possible morphologies (Davie, 2002, p. 198); fronto-orbital margin at least two-thirds maximum carapace width, usually approximately 80 percent but can be as much as 100 percent; eye-stalk short, apparently well calcified as it can be fossilized; basal article of antenna reaching front; merus of third maxilliped subquadrate, much longer than ischium; anterolateral margin with three or so spines, not well differentiated from posterolateral margin; posterolateral reentrant well developed; sternum wide; sterno-pleonal cavity reaching anterior of sternite 4; all sternal sutures interrupted except 5/6 in some genera, sternite 8 barely visible in ventral view or covered; male pleon with all somites free and movable, somites 4–6 much narrower than somite 3, telson usually longer than wide, male pleon filling entire space between coxae of fifth pereiopods; male gonopod 1 long and thin, narrow apically, ornamented with small tubercles; gonopod 2 very short; chelipeds isochelous or weakly heterochelous; dactyli of pereiopods 2–5 usually styliform, with or without setae. [Emended from Davie, 2002, p. 198; Karasawa & Kato, 2003, p. 138; Karasawa & Schweitzer, 2006, p. 57; Castro & Ng, 2010, p. 5–6.] *Paleocene–Holocene*.

Baldoplax Beschin & De Angeli, 2011, p. 6 [**B. bonizzatoi,* p. 8, fig. 2–3; OD]. Carapace wider than long, widest at position of last anterolateral spine about one-quarter the distance posteriorly; front straight; orbits very wide, margin sinuous, with notch at about mid-length, orbits directed weakly anterolaterally; anterolateral margin short, with two blunt spines and one sharp spine not including outer-orbital spine; posterolateral margin long, with a blunt projection anteriorly; axial regions outlined laterally but not well developed; carapace with weak scabrous ornamentation on branchial regions. *Eocene* (*Ypresian–Luetian*): Italy.——Fig. 2,*4*. **B. bonizzatoi,* holotype MCZ 3388-I.G. 236926, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Chirinocarcinus Karasawa & Schweitzer, 2004, p. 149 [**Glyphithyreus wichmanni* Feldmann & others, 1995, p. 14, fig. 11; OD]. Carapace slightly wider than long, length ~80% maximum width, widest about one-third the distance posteriorly at position of last anterolateral spine; front notched, about one-third maximum carapace width, projecting beyond orbits; orbits entire, directed forward; fronto-orbital width ~60% maximum

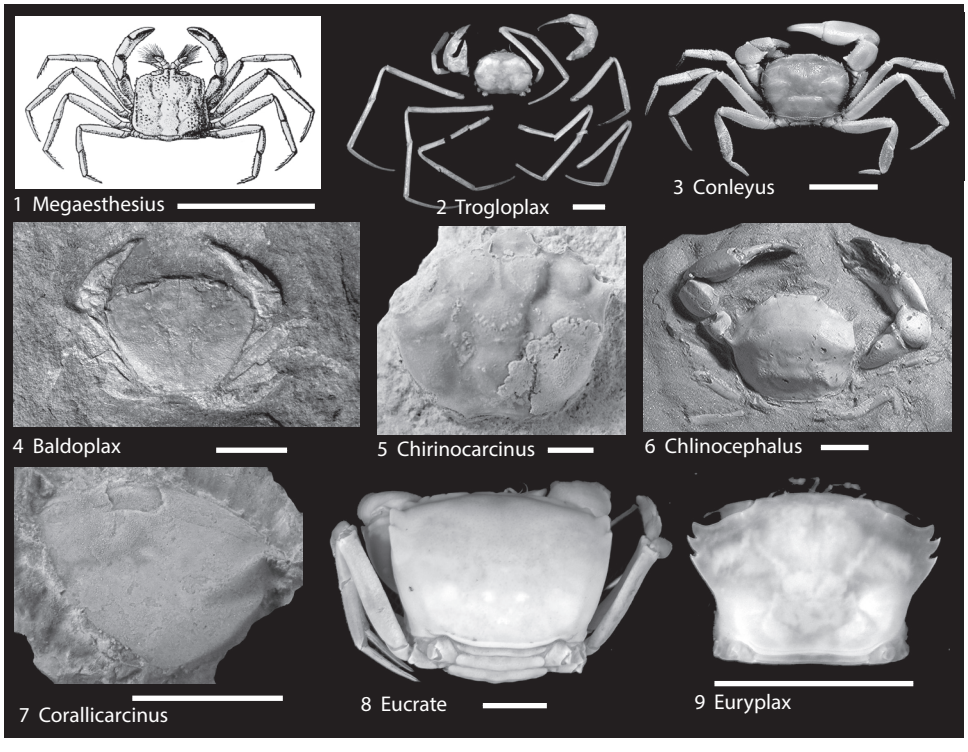

FIG 2. Chasmocarcinidae, Conleyidae, Euryplacidae (p. 4–7).

width; anterolateral margin very short, with three spines excluding outer-orbital spine, last spine longest; posterolateral margins well developed; carapace regions developed as broadly inflated areas separated by deep grooves. [Emended from KARASAWA & SCHWEITZER, 2004, p. 149.] *Paleocene:* Argentina.——FIG. 2,*5*. **C. wichmanni* (FELDMANN & others), holotype GHUNLPam 7015, scale bar, 1 cm (FELDMANN & others, 1995, p. 14, fig. 11).

Chlinocephalus RISTORI, 1886, p. 101 [**C. demissifrons,* p. 101, pl. 2,*5–6;* M]. Carapace ovate; axial regions defined; surface with transverse keels, one extending across epibranchial and mesogastric, another extending across branchial and cardiac regions; sternum ovate. *Pliocene:* Italy.——Fig. 2,*6*. **C. demissifrons,* PU 41187, scale bar, 1 cm (new; photo by A. Garassino, Loma Linda University, California, USA).

Corallicarcinus MÜLLER & COLLINS, 1991, p. 84 [**Neptocarcinus spinosus* LŐRENTHEY in LŐRENTHEY & BEURLEN, 1929, p. 217, pl. 10,*5;* OD]. Carapace ovate, wider than long; front broadly convex, orbits small; anterolateral margins with four spines, first two broad, second pair smaller and sharper, last spine extending onto dorsal carapace as sinuous ridge; posterolateral margins longer than anterolateral margin, nearly straight, converging posteriorly; posterior margin short; dorsal surface with ridge parallel to anterior margin of carapace just posterior to orbital and anterolateral margins. *Eocene* (*Priabonian*): Hungary, Italy.——FIG. 2,*7*. **C. spinosus* (LŐRENTHEY in LŐRENTHEY & BEURLEN), KSU D 117, cast of NHMH M91.205, scale bar, 1 cm (new).

Eucrate DE HAAN, 1835 in 1833–1850, p. 36 [**Cancer* (*Eucrate*) *crenatus;* M, ICZN Opinion 85, 1925] [=*Pilumnoplax* STIMPSON, 1858, p. 39 (type, *P. sulcatifrons,* SD RATHBUN, 1918, p. 21); =*Pseudozius* (*Platyozius*) BORRADAILE, 1902, p. 243 (type, *P.* (*P.*) *laevis,* p. 243, fig. 45, M)]. Carapace subquadrilateral, slightly wider than long, widest at anterolateral angle; fronto-orbital width about two-thirds carapace width; frontal margin nearly straight, delimited from well-defined supraorbital angle, with shallow median notch; upper orbital margin with two distinct notches; anterolateral margin short, convex, with four spines; posterolateral margin convergent posteriorly; dorsal surface smooth, transversely convex, with poorly defined regions; chelipeds massive, subequal. *Oligocene–Holocene. Oligocene:* USA (Oregon). *Pleistocene:* Japan, Taiwan. *Holocene:* Indo-West Pacific Ocean.——FIG. 2,*8*. **E. crenata,* USNM 1155087, Holocene, Indo-West Pacific Ocean, scale bar, 1 cm (new).

Euryplax STIMPSON, 1862, p. 60 [**E. nitidus;* M]. Carapace hexagonal, wider than long; front very wide, about half maximum carapace width; fronto-orbital width very, wide, nearly entire carapace width,

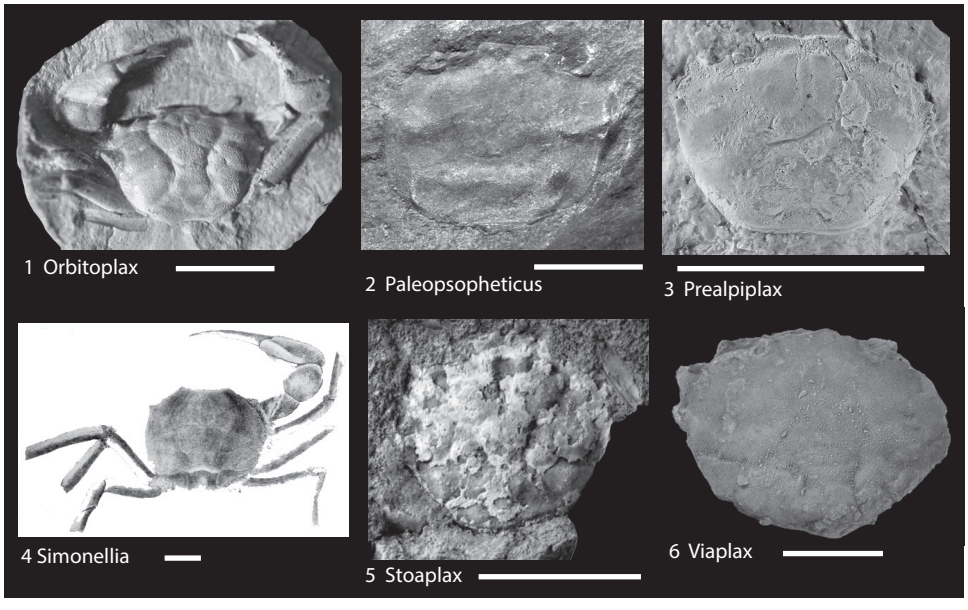

FIG 3. Euryplacidae (p. 7–8).

orbital margin sinuous, weakly rimmed; anterolateral margin short, with three well-developed spines; posterolateral margin much longer than anterolateral margin, weakly concave; posterior margin wide, nearly straight; sterno-pleonal cavity deep; chelipeds weakly heterochelous. *Miocene:* Panama. *Holocene:* western Atlantic Ocean, eastern Pacific Ocean, Caribbean Sea.——FIG. 2,*9*. **E. nitidus,* USNM 271410, Holocene, North Atlantic Ocean, scale bar, 1 cm (new).

Orbitoplax TUCKER & FELDMANN, 1990, p. 421 [**O. plafkeri,* p. 421, fig. 10; OD]. Carapace hexagonal, wider than long; orbits wide, each between 25–30% maximum carapace width; front broad, ~25–30% maximum carapace width; fronto-orbital width broad, at least 80% maximum carapace width; carapace regions smooth or granular, delineated by deep grooves; branchial regions inflated; anterolateral margins short, with one or two spines; posterolateral margin long, weakly convex, posteriorly convergent; chelipeds subequal. [Emended from SCHWEITZER, 2000, p. 724.] *Paleocene:* USA (California). *Eocene:* USA (Alaska, California, Oregon, Washington).——FIG. 3,*1*. *O. weaver* (RATHBUN, 1926), OUMNCH F61327, Eocene, Oregon, USA, scale bar, 1 cm (new; photo by G. Retallack, University of Oregon, Eugene, Oregon, USA).

Paleopsopheticus HU & TAO, 1996, p. 102 [**P. shugenae,* p. 102, pl. 49,*1,2,5,6;* OD]. Carapace rectangular, wider than long; front straight; orbits wide, directed forward, with sinuous orbital margin, triangular, forward-directed outer-orbital spine; fronto-orbital margin occupying nearly entire carapace width; anterolateral and posterolateral margins confluent, anterolaterally with two spines; dorsal surface with concave forward arcuate ridges on epibranchial regions and transverse ridge on branchial and cardiac regions. *Oligocene:* Taiwan.——FIG. 3,*2*. **P. shugenae,* NMNS 112163-F007912, scale bar, 1 cm (new; photo by T.-Y. Chan, National Taiwan Ocean University).

Prealpiplax BESCHIN, BUSULINI, TESSIER, & ZORZIN, 2016, p. 145 [**P. lessinea,* p. 145, pl. 19,*4;* OD]. Carapace slightly wider than long, front nearly straight, with weak indentation axially; orbits wide, directed slightly anterolaterally; anterolateral margins short, with four blunt spines including outer-orbital angle; posterolateral margins weakly convex; regions not well defined, mesogastric region distinct. *Eocene* (*Ypresian*): Italy——FIG. 3,*3*. **P. lessinea*, holotype VR94541, scale bar, 1 cm (new; photo by G. Tessier, Museo Civico di Storia Naturale, Venice, Italy).

Simonellia VINASSA DE REGNY, 1897, p. 20 [**S. quiricensis,* p. 20, pl. 2; M]. Carapace wider than long, rectangular; front projecting slightly, downturned; anterolateral margins with two spines; carapace regions poorly defined; sternum broadly ovate. *Pliocene:* Italy.——FIG. 3,*4*. **S. quiricensis,* scale bar, 1 cm (VINASSA DE REGNY, 1897, pl. 2,*1a*).

Stoaplax VEGA, COSMA, COUTIÑO, FELDMANN, NYBORG, SCHWEITZER, & WAUGH, 2001, p. 939 [**S. nandachare,* p. 940, fig. 15; OD]. Carapace wider than long, ovate; front projected beyond orbits, axially notched, widest distally, narrowing at base; orbits deep, rectangular, with sinuous upper-orbital margin, one fissure; outer-orbital spine triangular, forward directed; anterolateral and posterolateral margins confluent, with one spine anterolaterally; posterior margin convex; regions moderately defined

as broad swellings. *Eocene* (*Ypresian*): Mexico (Chiapas).——Fig. 3,*5*. **S. nandachare,* holotype, IHNCH 3468, scale bar, 1 cm (new).

Viaplax Karasawa & Kato, 2003, p. 140 [**Pilumnoplax urpiniana* Vía Boada, 1959, p. 58, fig. 16; OD]. Carapace wider than long, transversely flattened; regions moderately defined, epibranchial regions arcuate; front with axial notch, otherwise straight; orbits rectangular, with two fissures, outer-orbital spine, triangular, directed forward; with four triangular anterolateral spines; male pleonal somites 5 and 6 much narrower than somite 3, telson much longer than wide. *Eocene* (*Lutetian*): Spain.——Fig. 3,*6*. **V. urpiniana* (Vía Boada), KSU D 212, cast of MGSB 9014, scale bar, 1 cm (new).

Family GONEPLACIDAE MacLeay, 1838

[*nom. correct.* Stebbing, 1902, p. 15, *pro* Gonoplacidae MacLeay, 1838, p. 64] [=Carcinoplacinae H. Milne Edwards, 1852, p. 164; =Bathyplacinae Števčić, 2005, p. 66; =Notonycidae Števčić, 2005, p. 62; =Psopheticini Števčić, 2005, p. 68; =Amydrocarcinidae Števčić, 2005, p. 69; =Lovaracarcinidae Števčić, 2011, p. 128; =Neommatocarcinidae Števčić, 2011, p. 128; =Michaeliinae Števčić, 2011, p. 128; =Kowaicarcinini Števčić, 2011, p. 130; =Microgoneplacini [sic] Števčić, 2013, p. 184, *nom. correct. pro* Microgeneplacini Števčić, 2011, p. 131; =Paragoneplacini Števčić, 2011, p. 131]

Carapace hexagonal, transversely ovate, or subquadrate; wider than long, sometimes markedly so, position of maximum width well in advance of mid-length; front straight, without median notch, sometimes with medial projection; upper orbital margins entire; notch between frontal margin and orbits indistinct; fronto-orbital width variable, ranging from two-thirds to 100 percent maximum carapace width; anterolateral margin with one to three spines excluding outer-orbital spines or entire; orbits and eyestalks short or long, sometimes extremely long; merus of third maxilliped subquadrate, longer than ischium; male pleon filling entire space between coxae of fifth pereiopods; all male pleonal somites free; sternum broad, ovate; sternal sutures 4/5, 5/6, and 7/8 interrupted, 6/7 complete or interrupted; sternite 8 not visible or small portion visible in ventral view; sterno-pleonal cavity reaching middle of sternite 4. Chelipeds robust compared to other pereiopods, without black tips on fingers, usually with lateral spine on carpus; dactyli of pereiopods 2–4 styliform or spatulate, with or without setae. Male gonopod 1 stout, sinuous, usually with truncated apex; male gonopod 2 long, usually with long flagellum. [Emended from Karasawa & Kato, 2003, p. 140; Karasawa & Schweitzer, 2006, p. 57; Castro, 2007, p. 616.] *Eocene–Holocene*.

Albaidaplax Garassino, Pasini, & Castro, 2013, p. 362 [**A. ispalensis,* p. 362, fig. 4; OD]. Carapace rectangular, slightly wider than long; front straight; orbits wide, upper orbital margin sinuous; anterolateral margins with two spines, including outer-orbital; carapace regions weakly defined. *Pliocene–Pleistocene:* Italy.——Fig. 4,*1*. **A. ispalensis,* paratype MGUS AA2, scale bar, 1 cm (new; photo by A. Garassino, Loma Linda University, California, USA).

Amydrocarcinus Schweitzer, Feldmann, González-Barba, & Vega, 2002, p. 17 [**A. dantei,* p. 18, fig. 19; OD]. Carapace ovoid, wider than long, length ~84% maximum width; regions poorly developed; orbits square, entire; anterolateral margin with tiny spines; sternum narrowly ovate; sternite 8 not visible ventrally; male pleon entirely filling space between coxae of fifth pereiopods; all male pleonal somites free. [Emended from Schweitzer & Karasawa, 2004, p. 73.] *Eocene:* Mexico (Baja California Sur).——Fig. 4,*2*. **A. dantei*, holotype MHN-UABCS/Te 14/43-32, scale bar, 1 cm (Schweitzer & others, 2002, fig. 19).

Astiplax Garassino & Pasini, 2013, p. 331 [**A. aspera,* p. 332, fig. 3–4; OD]. Carapace transversely ovate, wider than long; front apparently narrow, orbits with sinuous upper margin; anterolateral and posterolateral margins entire, curving continuously one into the other; carapace surface densely granular, regions well defined; weak arcuate transverse ridges on epibranchial and branchial regions. *Pliocene:* Italy.——Fig. 4,*3*. **A. aspera,* MSNM i27828, scale bar, 1 cm (new; photo by A. Garassino, Loma Linda University, California, USA).

Carcinoplax H. Milne Edwards, 1852, p. 164 [**Cancer* (*Curtonotus*) *longimanus* De Haan, 1835 in 1833–1850, p. 50, pl. 6,*1;* SD Glaessner, 1929, p. 111] [=*Curtonotus* De Haan, 1833 in 1833–1850, p. 20 (preoccupied name); =*Glaessneroplax* Števčić, 2005, p. 133 (type, *Pilumnoplax petrificus* Hu & Tao, 1996, p. 101, pl. 47,*13*, OD)]. Carapace transversely hexagonal to roundly quadrate, widest at anterolateral angle; front nearly straight; upper orbital margin without fissures; anterolateral margin strongly convex with two to three spines; dorsal surface smooth, convex; regions poorly defined; thoracic sternum usually wide; sternite 8 in male covered with pleon; male pleon with 7 free somites; chelipeds subequal, sometimes elongate in male. *Eocene–Holocene. Eocene* (*Bartonian–Priabonian*): New Zealand. *Miocene* (*Burdigalian–Langhian*): New Zealand. *Miocene:* Iran. *Miocene–Pleistocene:* Japan, Taiwan. *Pleistocene:* Sarawak. *Holocene:* Indo-West Pacific Ocean.——Fig. 4,*4*. *Carcinoplax antiqua* (Ristori,

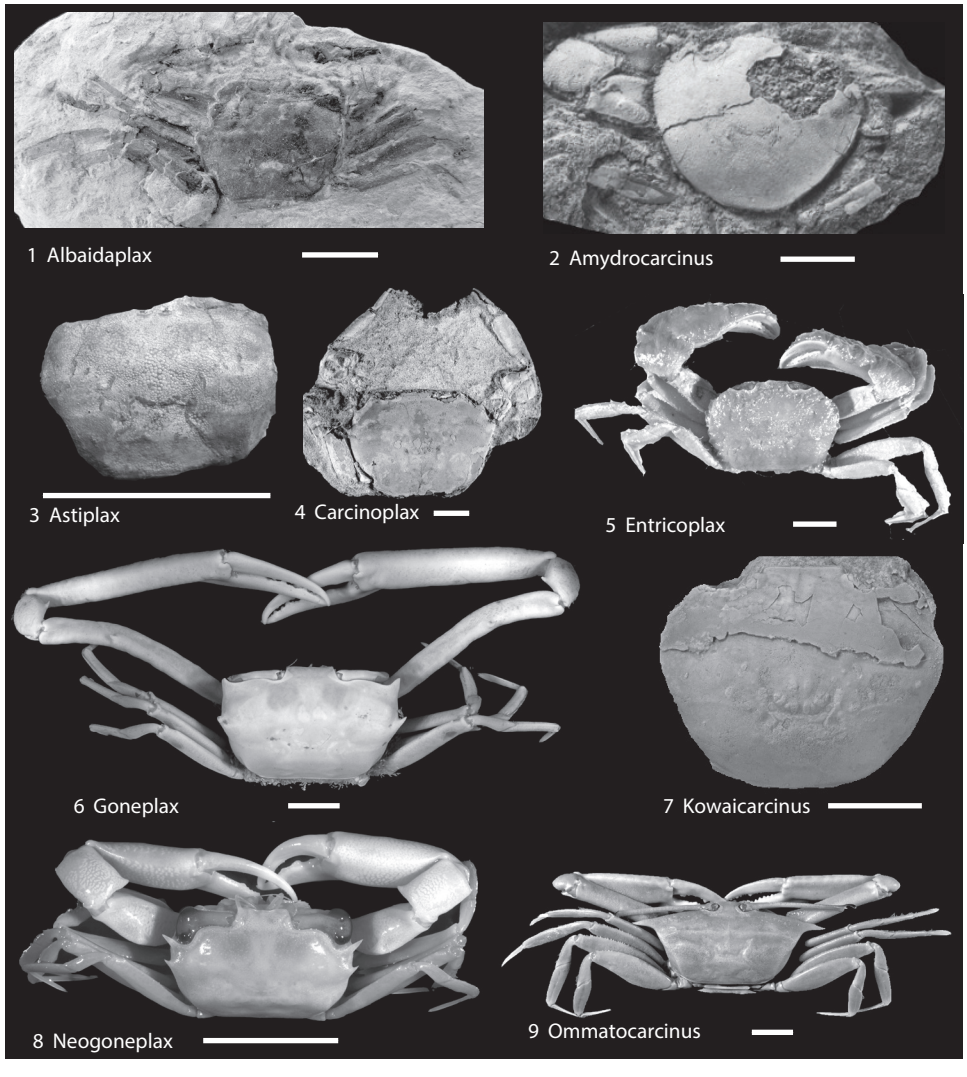

FIG 4. Goneplacidae (p. 8–10).

1889), MFM 39165, Miocene, Japan, scale bar, 1 cm (new).

Entricoplax CASTRO, 2007, p. 654 [**Cancer* (*Curtonotus*) *vestitus* DE HAAN, 1833 in 1833–1850, p. 51, pl. 5,*3;* M]. Carapace transversely rectangular, widest at anterolateral angle; front weakly concave; upper orbital margin without fissures; anterolateral margin strongly convex with two spines; dorsal surface convex with conspicuous setae; regions poorly defined; thoracic sternum wide; male pleon with seven free somites; chelipeds subequal conspicuous setae; pereiopods 2–5 with setae. *Pleistocene–Holocene. Pleistocene:* Japan. *Holocene:* Yellow and East China seas, Japan.——FIG. 4,*5.* **E. vestitus,* MFM 129117, Holocene, Japan, scale bar, 1 cm (new).

Goneplax LEACH, 1814 in 1813–1814, p. 430 [**Ocypoda bispinosa* LAMARCK, 1801, p. 150; OD, ICZN Opinion 85, 1925; ICZN Direction 37, 1956; =*Cancer rhomboides* LINNAEUS, 1758, p. 626] [=*Goneplat* LEACH, 1814 in 1813–1814, p. 393, incorrect original spelling, ICZN Direction 37, 1956]. Carapace hexagonal, wider than long; front straight, orbits very wide, occupying nearly entire carapace width, upper-orbital margin sinuous; outer-orbital spine triangular, directed anterolaterally; lateral margins converging posteriorly, with one or so spines posterior to outer-orbital spine; carapace smooth; chelipeds stout. *Miocene–Holocene. Miocene* (*Langhian*): Hungary, Spain. *Miocene* (*Langhian–Serravallian*): Austria, Italy. *Tortonian:* Spain. *Messinian:* Italy. *Miocene:* Algeria, Italy.

Pliocene (*Zanclean*): Italy, UK (England). *Pliocene:* Algeria, Italy. *Pleistocene:* Italy. *Holocene:* Atlantic Ocean, Mediterranean Sea.——Fig. 4,*6*. **G. rhomboides* (Linnaeus), USNM 173089, Holocene, Indian Ocean, scale bar, 1 cm (new).

Kowaicarcinus Feldmann, Schweitzer, Maxwell, & Kelley, 2008, p. 49 [**K. maxwellae,* p. 51, fig. 3; OD]. Carapace hexagonal to transversely ovate, length ~80% maximum width, widest about half the distance posteriorly; moderately vaulted longitudinally, weakly vaulted transversely; regions poorly defined; front straight, with ridge parallel to frontal margin, ~35% carapace width; orbits, deep, ovate, directed forward, fronto-orbital width ~70% maximum carapace width, outer-orbital spine short; anterolateral margin entire or weakly lobed; posterolateral margin nearly straight. [Emended from Feldmann & others, 2008, p. 49.] *Pliocene:* New Zealand.——Fig. 4,*7*. **K. maxwellae,* holotype CM 1998.171.16, Pliocene, New Zealand, scale bar, 1 cm (Feldmann & others, 2008, fig. 3H).

Neogoneplax Castro, 2007, p. 699 [**Goneplax renoculis* Rathbun, 1914, p. 145; OD]. Carapace wider than long, trapezoidal, smooth; front overall straight, with concave lateral margins, with weak axial notch; orbits extremely wide, with sinuous upper orbital margin, outer-orbital spine directed anterolaterally, may have one anterolateral spine, carapace widest at position of outer-orbital spine or anterolateral spine, about one-quarter the distance posteriorly, carapace narrowing posteriorly; anterolateral margins much shorter than posterolateral margins; carapace regions weakly defined; sternal sutures 4/5, 5/6, and 7/8 interrupted, 6/7 complete. [Emended from Castro, 2007, p. 699). *Miocene–Holocene. Miocene* (*Aquitanian–Serravallian*): New Zealand. *Holocene:* Indo-West Pacific Ocean.——Fig. 4,*8*. **N. renoculis* (Rathbun), MNHN-IU-2014-11762, Holocene, Philippines, scale bar, 1 cm (photo by N. Mollaret, RECOLNAT (ANR-11-INBS-0004), MNHN).

Ommatocarcinus White, 1852, p. 393 [**O. macgillivrayi*, pl. 5,*1;* M, ICZN Opinion 85, 1925]. Carapace much wider than long, widest at outer-orbital corner; front narrow, widening distally, T-shaped; orbital margin very long, extending beyond carapace margin in laterally directed outer-orbital spine; lateral margins converging distally, nearly straight; posterior margin straight; carapace regions undefined, transverse keel extending across epibranchial and mesobranchial regions. *Miocene–Holocene. Miocene* (*Burdigalian–Messinian*): Australia (New South Wales, South Australia, Victoria). *Miocene:* Taiwan. *Pliocene:* Australia (New South Wales, South Australia, Victoria), New Zealand, Taiwan. *Pleistocene*: Australia, Italy, Japan, New Zealand, Taiwan. *Holocene:* Indo-West Pacific Ocean.——Fig. 4,*9*. **O. macgillivrayi,* CBM-ZC 3773, Holocene, Indo-West Pacific Ocean, scale bar, 1 cm (photo by H. Kato, Natural History Museum and Institute, Chiba, Japan).

Psopheticus Wood-Mason, 1892, pl. 5,*1* [**P. stridulans,* pl. 5,*1;* M, ICZN Opinion 85, 1925, Direction 37, 1956]. Carapace quadrilateral to transversely hexagonal, widest at anterolateral angle; front nearly straight; orbit usually wide; upper orbital margin with weak projection; anterolateral margin with two spines; dorsal surface smooth, convex; regions distinct; thoracic sternite 8 in male covered with pleon; male pleon with 7 free somites; chelipeds equal, sometimes elongate in male; meri of pereiopods 2–5 usually bearing spines on upper margin. *Pliocene–Holocene. Pliocene:* Japan. *Holocene:* Indo-West Pacific Ocean.——Fig. 5.*1*. **P. stridulans,* MNHN-IU-2014-11697, Holocene, Indonesia, scale bar, 1 cm (photo by N. Mollaret, RECOLNAT (ANR-11-INBS-0004), MNHN).

Family LITOCHEIRIDAE Kinahan, 1856

[Litocheiridae Kinahan, 1856, p. 116]

Carapace rectangular to trapezoidal, surface smooth, regions poorly defined; front wide, entire, projecting slightly beyond orbits, orbits and eyestalks short; anterolateral margins very short; posterolateral margins very long or the two nearly confluent; posterior margin wide; carapace may have broad transverse ridges; chelipeds large; sternal suture 6/7 entire, 4/5, 5/6, and 7/8 interrupted; penial groove on sternite 7/8; male pleon wide, covering most of sternite 8, all male somites free. [Emended from Davie, Guinot, & Ng, 2015, p. 1084.] *Eocene–Holocene*.

Litocheira Kinahan, 1856, p. 116 [**L. bispinosa*, p. 117, p. 3,*1;* M, ICZN Opinion 85, 1926, ICZN Direction 37, 1956; =*Melia brevipes* Haswell, 1881, p. 545; =*Brachygrapsus laevis* Kingsley, 1880, p. 203] [=*Brachygrapsus* Kingsley, 1880, p. 203 (type, *B. laevis,* M)]. Carapace rectangular, front smooth, wide; anterolateral and posterolateral margins confluent with two anterolateral spines; chelipeds short. *Holocene:* Indo-Pacific Ocean.——Fig. 5,*2*. **L. bispinosa,* Holocene, Indo-Pacific, NBCN 7232, scale bar, 1 cm (new).

Gollincarcinus Beschin & De Angeli, 2004, p. 15 [**G. levis,* p. 15, pl. 1; OD]. Carapace trapezoidal wider than long, widest ~25% the distance posteriorly, carapace smooth, regions undefined, strongly vaulted longitudinally, flattened transversely; front wide, entire, convex, about half maximum carapace width; orbits wide, shallow, rimmed, directed weakly anterolaterally, fronto-orbital width ~85% maximum carapace width; anterolateral margins short, entire, posterolateral margins very long, weakly concave. *Eocene* (*Lutetian*): Italy.——Fig.

5,*3*. **G. levis,* holotype MCZ 2405-I.G.305113, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Lessinioplax Beschin & De Angeli, 2004, p. 16 [**L. simplex,* p. 18, pl. 2; OD]. Carapace about as long as wide, smooth, widest ~25% the distance posteriorly, ornamented with pits overall; regions undefined, very strongly vaulted longitudinally, flattened transversely; front wide, convex, about half maximum carapace width, rimmed; orbits rimmed, shallow, directed anterolaterally, fronto-orbital width ~80% maximum carapace width; anterolateral margins short, rimmed; posterolateral margins long, concave. *Eocene* (*Lutetian*): Italy.——Fig. 5,*4*. **L. simplex,* MCZ 2409-I.G. 305117, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Maingrapsus Tessier, Beschin, Busulini, & De Angeli, 1999, p. 98 [**M. quadratus,* p. 98, pl. 2,*1–3;* OD]. Carapace subquadrate, widest posteriorly, vaulted; front wide, convex, without spines or fissures; orbits small, situated at the anterior corners, fronto-orbital occupying nearly maximum carapace width; lateral margins parallel, sinuous; posterior margin wide, with large posterolateral reentrants; dorsal surface smooth, with three transverse ridges; regions not defined. *Eocene* (*Lutetian*): Italy.——Fig. 5,*5*. **M. quadratus,* holotype MCZ 1613, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Paracorallicarcinus Tessier, Beschin, Busulini, & De Angeli, 1999, p. 95 [**P. arcanus*, p. 95, pl. 1; OD]. Carapace trapezoidal, vaulted, wider than long, widest about one-third the distance posteriorly; front very wide, convex; fronto-orbital margin wide, continuous, without spines or fissures; orbits small, oval, placed at anterior edges of anterior margin of carapace; anterolateral margin and posterolateral margins confluent, with a few spines anterolaterally; posterior margin long, with well-developed posterolateral reentrants; dorsal surface smooth, with three transverse swellings. *Eocene* (*Lutetian*): Italy. *Eocene:* Mexico (Baja California Sur).——Fig. 5,*6*. **P. arcanus,* holotype MCZ 1595, Lutetian, Italy, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Family MAGYARCARCINIDAE Domínguez & Ossó, 2016

[Magyarcarcinidae Domínguez & Ossó, 2016, p. 10]

Carapace ovate, smooth, width approximately 80 percent length, widest approximately 40 percent posteriorly on carapace; front straight, orbits directed forward, with one fissure, fronto-orbotal width approximately 70 percent maximum carapace width; anterolateral margins entire, merging continuously with posterolateral margins; sternum wide, sternite 8 not visible, sternal sutures 3/4, 4/5, and 5/6 apparently interrupted, suture 6/7 complete; male pleon with all somites free. [Emended from Schweitzer & Karasawa, 2004, p. 76; Domínguez & Ossó, 2016, p. 10.] *Eocene*.

Magyarcarcinus Schweitzer & Karasawa, 2004, p. 76 [**Palaeograpsus loczyanus* Lőrenthey, 1898, p. 69, pl. 4,*6;* OD]. *Eocene:* Hungary, Italy. *Eocene* (*Bartonian–Priabonian*): Spain.——Fig. 5.*7*. **M. loczyanus*, KSU D 169, cast of holotype MAFI E283, Eocene, Hungary, scale bar, 1 cm (new).

Family MARTINOCARCINIDAE Schweitzer, Feldmann, & Bonadio, 2009

[Martinocarcinidae Schweitzer, Feldmann, & Bonadio, 2009, p. 3]

Carapace wider than long; orbits shallow, with two intra-orbital spines and two notches; one suborbital spine; anterolateral and posterolateral margins confluent, anterolateral portion with five spines excluding outer-orbital spine of varying sizes ornamented with spinelets, posterolateral portion with at least three spines ornamented with spinelets, weak constriction between anterolateral and posterolateral portions; first anterolateral spine set at same level as orbits so that anterior margin of carapace is broad; carapace regions well marked by broad grooves and tumid, granular central areas; male sternum broadly ovate, granular; sternites 1 and 2 fused; sternite 3 clearly separated from sternite 4 by deep groove and with deep axial groove; sternite 4 directed weakly anterolaterally, with swelling parallel to anterior margins that may be fused episternal projections of sternite 3, with concave, ungranulated area adjacent to swellings; sternite 5 directed laterally; sternite 6 directed weakly posterolaterally; sternite 7 directed posterolaterally; sternite 8 unknown; male pleon with somites 4, 5, and 6 apparently unfused; basal articles of antennae and eyestalks well calcified; tips of fingers of cheliped black. [Schweitzer, Feldmann, & Bonadio, 2009, p. 3.] *Eocene*.

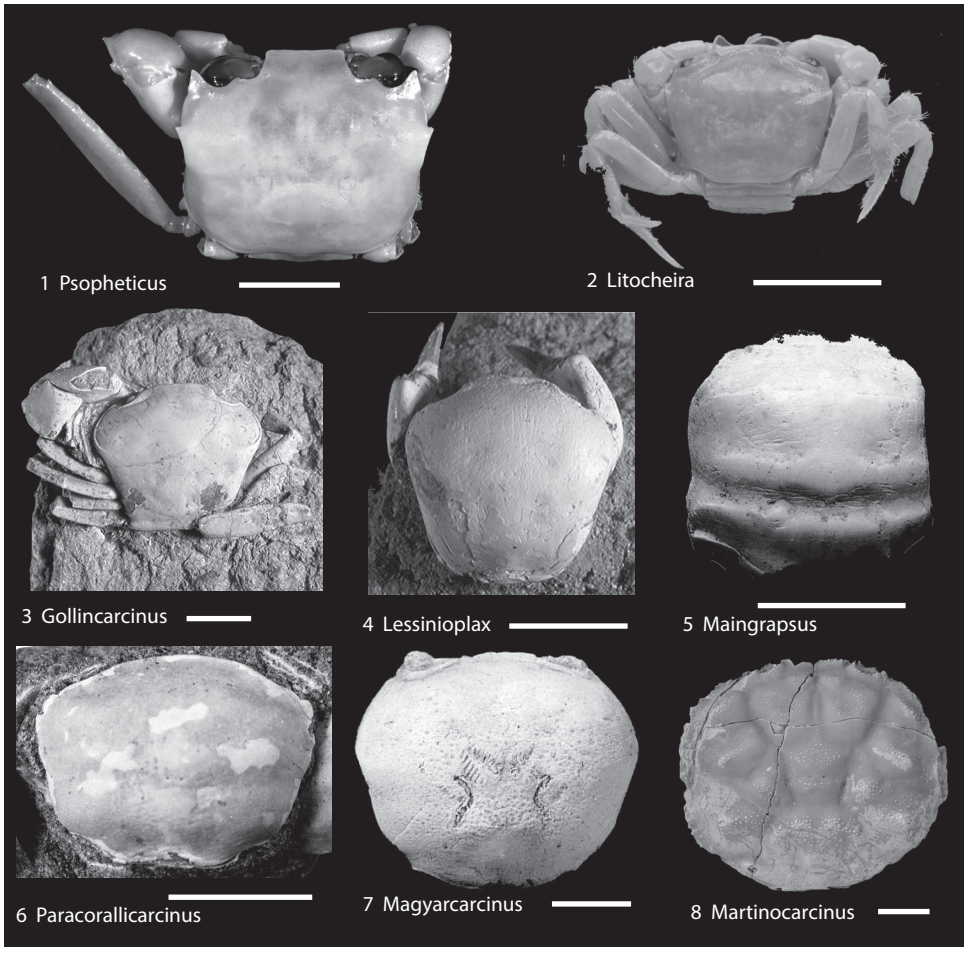

FIG 5. Goneplacidae, Litocheiridae, Magyarcarcinidae, Martinocarcinidae (p. 10–12).

Martinocarcinus BÖHM, 1922, p. 531 [**M. ickeae* BÖHM, 1922, p. 531, pl. 63,14a–14b; OD]. As for family. *Eocene:* Java.——FIG. 5,*8. *M. ickeae,* holotype RGM 11762, scale bar, 1 cm (new).

Family MATHILDELLIDAE Karasawa & Kato, 2003

[*nom. transl.* KARASAWA & SCHWEITZER, 2006, p. 61, *ex* Mathildellinae KARASAWA & KATO, 2003, p. 137] [=Intesiini ŠTEVČIĆ, 2005, p. 65; =Platypilumninae ŠTEVČIĆ, 2005, p. 66; =Tehuacanini ŠTEVČIĆ, 2011, p. 132]

Carapace flattened, rectangular, with weakly defined dorsal carapace regions; front usually straight with shallow median notch, may be dentate; supraorbital angle separated from frontal margin; orbit usually relatively small but may be wide, with upper orbital fissures; anterolateral margin with four or typically five spines including outer-orbital; eye stalk short; antennular fossae broad laterally; merus of maxilliped 3 subquadrate, much longer than ischium; male pleon filling entire or nearly entire space between coxae of pereiopods 5, usually with all somites distinguishable, however, male pleonal somites 3–5 are immovable; male pleonal somites 4 and 5 with sinuous lateral margins; telson of male pleon semicircular or triangular; sternum wide with interrupted sutures except continuous sutures 6/7 and 7/8; posterolateral prolongation of male episternite 7 not marked; sterno-pleonal cavity reaching posterior of sternite 4; chelipeds with dark-colored fingers; dactyli of

pereiopods 2–5 with corneous tips; dactyli of pereiopod 5 spatulate with setae; gonopod 1 stout, curved, strongly inflated basally, with simple apex; gonopod 2 usually long with long flagellum. [Emended from KARASAWA & KATO, 2003, p. 137; KARASAWA, SCHWEITZER, & FLEDMANN, 2008, p. 96.] *Upper Cretaceous* (*Campanian*)*–Holocene*.

Mathildella GUINOT & RICHER DE FORGES, 1981, p. 230 [**M. maxima,* p. 231, pl. 2,*2;* OD]. Carapace widest about one-third the distance posteriorly; front straight; anterolateral margins shorter than posterolateral margins, with four or so spines or protuberances; orbits oblique, deeper laterally; one endostomial ridge; carapace regions weakly defined, epibranchial ridges absent. *Holocene:* Indo-Pacific Ocean.——FIG. 6,*1*. **M. maxima,* holotype MNHN-IU-2014-11255, Holocene, French Polynesia, scale bar, 1 cm (photo by M. Hennon, Project RECOLNAT [ANR-11-INBS-0004]).

Branchioplax RATHBUN, 1916, p. 344 [**B. washingtoniana,* p. 345; OD; =*Pilumnoplax hannibalanus* RATHBUN, 1926, p. 39, pl. 10,*1–4*]. Carapace slightly wider than long, widest at position of last or penultimate anterolateral spine, regions poorly to moderately defined, urogastric and intestinal regions may be well defined and deeply depressed, branchial regions may be strongly inflated; front with shallow axial notch; frontal width about one-third maximum carapace width; orbits circular, shallow, two orbital fissures; fronto-orbital width from two-thirds to three-quarters maximum carapace width; anterolateral margins with two to five small spines; posterolateral margins weakly to moderately convex; posterior margin about half maximum carapace width; sternite 8 in males obscured by pleon; first pereiopods strongly heterochelate, [Emended from SCHWEITZER, 2000, p. 728.] *Paleocene:* Senegal. *Eocene* (*Ypresian–Priabonian*): Italy. *Lutetian*: UK (England). *Eocene* (*Bartonian*): Japan, USA (Alaska, Washington). *Priabonian:* Hungary. *Oligocene* (*Rupelian*): Italy. *Oligocene:* Tajikistan; USA (Alaska, Washington).——FIG. 6,*2*. **B. washingtoniana,* T165, Eocene, Washington, USA, scale bar, 1 cm (new).

Homoliformis COLLINS, SCHULZ, & JAKOBSEN, 2005, p. 19 [**H. vagus,* p. 19, pl. 1,*1–2;* OD]. Carapace quadrate, wider than long; regions moderately defined; epibranchial region arcuate, comprised of an inner triangular and outer ovate lobe. Based on a single incomplete specimen. *Eocene* (*Ypresian*): Denmark.——FIG. 6,*3*. *H. vagus,* holotype MHM-D220, scale bar, 1 cm (COLLINS, SCHULZ, & JAKOBSEN, 2005, pl. 1,*2*).

Neopilumnoplax SERÈNE in GUINOT, 1969, p. 689 [**Pilumnus heterochir* STUDER, 1883, p. 11, fig. 3; OD]. Carapace regions moderately defined. epibranchial and protogastric ridges usually present; anterolateral margins with three or so spines. *Miocene–Holocene. Miocene* (*Burdigalian*): Slovenia. *Holocene:* Indo-Pacific Ocean.——FIG. 6,*4*. *N. nielli* AHYONG, 2008, USNM 55148, Holocene, Australia, scale bar, 1 cm (new).

Prebranchioplax VEGA, AHYONG, ESPINOSA, FLORES-VENTURA, LUNA, & GONZÁLEZ-GONZÁLEZ, 2018, p. 4 [**P. cretacica,* p. 5, fig. 3–4; OD]. Carapace approximately as wide as long, anterolateral margins short, with spines and very short, blunt projections; orbits wide, with two fissures; fronto-orbital width wide, more than half maximum carapace width; carapace regions moderately developed. *Upper Cretaceous* (*Campanian*) Mexico (Coahuila).——Fig. 6,*5*. **P. cretacica,* paratype CPC-2076, scale bar, 1 cm (new; photo by F. Vega, Universidad Nacional Autonoma de Mexico, Ciudad de México, Mexico).

Tehuacana STENZEL, 1944, p. 546 [**T. tehuacana,* p. 546, pl. 93,*6–9;* OD]. Carapace about as wide as long, rectangular, regions moderately defined; front axially notched; orbits shallow, with two fissures; anterolateral margins with four or five blunt projections; posterolateral margin convex, posterolateral reentrants large; posterior margin straight; epibranchial regions arcuate, wide; sternite 4 long. *Paleocene* (*Thanetian*): Mexico (Coahuila). *Paleocene:* USA (Texas). *Eocene* (*Ypresian–Lutetian*): Mexico (Chiapas).——FIG. 6,*6*. **T. tehuacana,* KSU D 587, cast of BSP 1988 III 248, Paleocene, Texas, USA, scale bar, 1 cm (new).

Family PROGERYONIDAE Števčić, 2005

[*nom. transl.* KARASAWA & SCHWEITZER, 2006, p. 54, *ex* Progeryonini ŠTEVČIĆ, 2005, p. 64] [=Paragalenini ŠTEVČIĆ, 2005, p. 64; =Rhadinoplacinae ŠTEVČIĆ, 2011, p. 128]

Carapace quadrate, approximately as long as wide or wider than long, widest at 50–65 percent the distance posteriorly, flattened, regions moderately defined; front bilobed, approximately 30 percent carapace width; orbits rimmed, sometimes fissured, fronto-orbital width about half carapace width, orbits and eyestalks short; anterolateral margin much shorter than posterolateral margin, convex, entire or with lobes, with spine at anterolateral angle; posterolateral margin nearly straight; sternum wide, sternal sutures 2/3, 6/7 and 7/8 complete, remainder interrupted; sternite 8 not visible in ventral view, all male pleonal somites free or 3/4 fused; chelipeds large, with molariform tooth on occlusal surface. [Emended from KARASAWA & SCHWEITZER, 2006, p. 54; DAVIE, GUINOT, & NG, 2015, p. 1085)]. *Holocene*.

No fossil representatives.

Paragalene KOSSMANN, 1878, p. 253 [**P. neapolitana,* p. 254; M, ICZN Opinion 85, 1925, ICZN Direction 37, 1956; =*Eriphia longicrura* NARDO,

1869, p. 302]. Carapace wider than long, widest approximately half the distance posteriorly; carapace regions moderately defined, hepatic and epibranchial ridges present; orbits with two fissures; anterolateral margins with at least four spines; carapace surface very finely and densely granular. *Holocene:* Northern Atlantic Ocean, Mediterranean Sea.——Fig. 6,*7*. **P. neapolitana,* NBCN 12986, Holocene, Mediterranean, scale bar, 1 cm (new).

Family SCALOPIDIIDAE Števčić, 2005

[Scalopidiidae Števčić, 2005, p. 107]

Carapace rectangular, wider than long, widest posteriorly regions poorly developed; front short, down-turned; orbits and eyestalks short; anterolateral margins with rim; posterolateral margins converging slightly posteriorly but nearly parallel; posterior margin wide; antennular flagella folding into shallow fossae; chelipeds heterochelous; sternum wide, sternites 4/5, 5/6, and 7/8 interrupted; penis in penial tube on sternite; male pleonal somites 3–5 fused; sternite 8 broadly visible in ventral view, pleon not touching coxae of fifth pereiopods. *Holocene*.

No fossil representatives.

Scalopidia Stimpson, 1858, p. 95 [**S. spinosipes*; M, ICZN Opinion 85, 1925, ICZN Direction 37, 1956] [=*Hypophthalmus* Richters, 1881, p. 430 (type, *H. leuchochirus,* M)]. As for family. *Holocene:* Indo-Pacific Ocean.——Fig. 6,*8*. **S. spinosipes,* USNM 17658, scale bar, 1 cm (new).

Family SOTOPLACIDAE Castro, Guinot, & Ng, 2010

[Sotoplacidae Castro, Guinot, & Ng, 2010, p. 38]

Carapace rectangular, wider than long, carapace surface smooth, regions poorly defined; orbits and eyestalks long; sternal sutures 4/5 through 7/8 interrupted; large part of sternite 8 visible in ventral view; all male pleonal somites free, telson very long and slender. *Holocene*.

No fossil representatives.

Sotoplax Guinot, 1984, p. 91 [**S. robertsi,* p. 92, fig. 1–3, pl. 1,*A–D;* OD]. As for family. *Holocene:* Caribbean Sea, northern Brazil.——Fig. 6,*9*. **S. robertsi,* ULLZ 7717, Holocene, Gulf of Mexico, scale bar, 1 cm (new).

Family VULTOCINIDAE Ng & Manuel-Santos, 2007

[Vultocinidae Ng & Manuel-Santos, 2007, p. 40]

Carapace quadrate, about as wide as long or longer than wide, regions very well developed and subdivided into subregions by deep, wide grooves; front about 30 percent carapace width; upper orbital margin with tubercles, orbits, and eyestalks short; sternum narrow, sterno-pleonal cavity reaching nearly to anterior of sternite 4; sternite 8 not visible in ventral view, sternal sutures 2/3 and 3/4 complete, 4/5 and 5/6 interrupted, remainder complete; male pleonal somites 3 and 4 fused, all sutures visible; chelipeds weakly heterochelous, with large tubercles on outer surfaces. *Eocene* (*Priabonian*)*–Holocene*.

Vultocinus Ng & Manuel-Santos, 2007, p. 49 [**V. anfractus,* p. 49, fig. 1–5, 8A, 9A, 10A, 11A, 12A, 13A; OD]. Carapace entirely covered with short, stiff setae; regions very well marked and complex, separated by deep, wide grooves, central areas of regions raised into narrow, sometimes sinuous elevations; pereiopods spinose. [Emended from Ng & Manuel-Santos, 2007, p. 40.] *Holocene:* Indo-Pacific Ocean.——Fig, 6,*10*. **V. anfractus,* holotype NMCR 19114, scale bar, 1 cm (new; photo by À. Ossó, Tarragona, Spain).

Pyreneplax Ossó, Domínguez, & Artal, 2014, p. 35 [**P. basaensis,* p. 38, fig. 3.1, 3.3, 4.1–4.4, 4.6; OD]. Carapace about as wide as long; frontal margin and orbital margins with tiny spines; regions well defined, broadly inflated, lacking sinuous elevations, especially on protogastric region; sternites 3 and 4 with broad axial depression, sternites 3–6 granular. *Eocene* (*Priabonian*): Spain.——Fig. 6,*11*. **P. basaensis,* holotype MPZ 2013.80, scale bar, 1 cm (new; photo by À. Ossó, Tarragona, Spain).

Superfamily HEXAPODOIDEA Miers, 1886

[*nom. transl.* Guinot, 1977, p. 1050, *ex* Hexapodinae Miers, 1886, p. 275]

As for family.

Family HEXAPODIDAE Miers, 1886

[*nom. transl.* Manning & Holthuis, 1981, p. 166, *ex* Hexapodinae Miers, 1886, p. 275]

Carapace rectangular, or rarely, trapezoidal; wider than long, average length/width approximately 0.68; lateral margins steep; regions typically poorly or moderately defined; front typically widest distally, axially sulcate, usually extending at least weakly beyond orbits, not deflexed; orbits

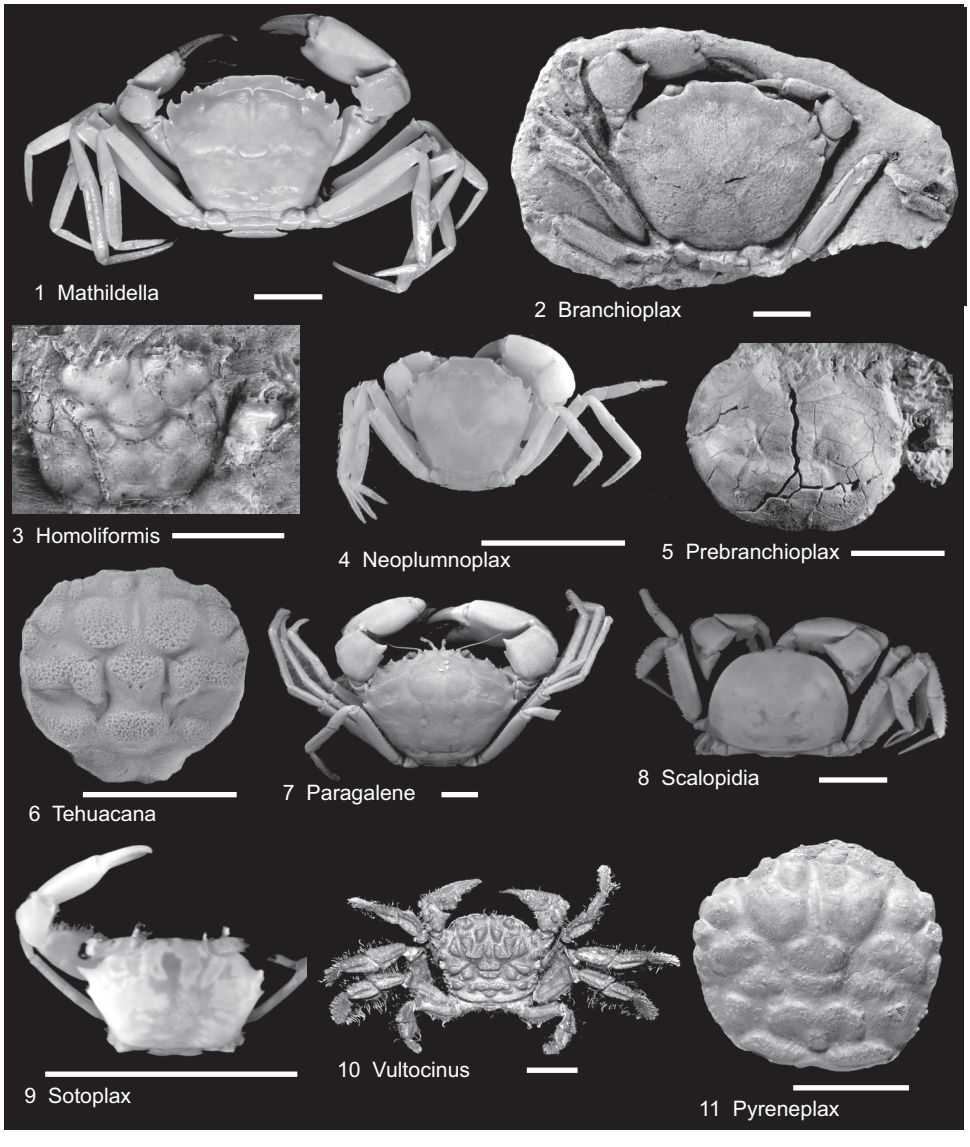

FIG 6. Mathildellidae, Progeryonidae, Scalopidiidae, Sotoplacidae, Vultocinidae (p. 13–14).

usually rimmed, upper margin sinuous; frontal margin straight, usually only partially occupied by orbits; fronto-orbital width to maximum width ratio averaging 0.45; fronto-orbital width to posterior width ratio averaging approximately 0.63; anterolateral and posterolateral margins confluent, typically with rim or ridge parallel to margin; posterolateral reentrant moderately well developed; posterior margin sometimes with small reentrant axial to posterolateral corner; posterior width to maximum width ratio usually between 0.73 and 0.93; sternite 4 with anterior projections; sternite 8 obscured; lacking pereiopods 5; male pleonal somites usually exhibiting fusion, usually somites 3–5 but may be 2–6. [Emended from KARASAWA & SCHWEITZER, 2006, p. 58.] *Lower Cretaceous* (*Berriasian–Hauterivian*)–*Holocene*.

Bellhexapus De Angeli, Guinot, & Garassino, 2010, p. 55 [**B. granulatus,* p. 56, fig. 2–3; OD]. Carapace slightly wider than long, trapezoidal, widest at posterior margin; front wide, sinuous; orbits rimmed, upper-orbital margin sinuous; carapace and sternum ornamented with broadly spaced granules; male pleon narrow, somites 2/3 apparently fused, somite 3 short, wide; somite 4 wider than long, with concave lateral margins; somite 5 slightly wider than long, with concave lateral margins; somite 6 longer than wide, wider than somite 5; telson apparently short, triangular; concave margins of somites yielding a scalloped appearance to overall lateral margins of pleon. *Eocene* (*Lutetian, Priabonian*): Italy.——Fig. 7,*1*. **B. granulatus,* paratype, MCZ 3011-I.G. 336941, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Eohexapus De Angeli, Guinot, & Garassino, 2010, p. 59 [**E. albertii,* p. 60, fig. 4–6; OD]. Carapace wider than long, rectangular, widest about half the distance posteriorly; front bilobed, rimmed; orbits circular; lateral margin rimmed anteriorly; dorsal carapace smooth, deep circular pits lateral to urogastric region; sternites 1 and 2 tiny; sternite 3 separated from 4 by deep lateral notch oriented parallel to axis; sternite 4 with anterior projections; female pleon with all somites free; sterno-pleonal cavity extending onto sternite 3. *Eocene* (*Lutetian*): Italy.——Fig. 7,*2*. **E. albertii,* holotype MCZ 3004-I.G. 336834, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Eurohexapus De Angeli, Guinot, & Garassino, 2010, p. 64 [**E. lobatus,* p. 64, fig. 7–9; OD]. Carapace about as long as wide, rectangular, widest at a little over half the distance posteriorly; front projected well beyond orbits, axially sulcate; orbits with very sinuous upper-orbital margin, rimmed, fronto-orbital width occupying entire frontal margin; carapace regions subtly defined as swellings; mesogastric region with two tubercles aligned axially; sternite 4 with tubercle on each side; male pleon very narrow, somites 2–6 fused but with obvious sutures, lateral margins on somites 3–5 concave. *Eocene* (*Lutetian*): Italy.——Fig. 7,*3*. **E. lobatus,* holotype MCZ 3007-I.G.336837, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Goniocypoda Woodward, 1867, p. 530 [**G. edwardsi,* p. 530, pl. 21,*1;* M]. Carapace subrectangular, corners rounded, especially anterolateral corner; front narrow, flared; fronto-orbital width occupying entire frontal margin of carapace; orbital margins rimmed, outer edge of orbit intersecting anterolateral corner; reentrants at posterolateral corner small; axial regions sometimes with small nodes. [Emended from Schweitzer & Feldmann, 2001, p. 335.] *Cretaceous–Eocene. Lower Cretaceous* (*Berriasian–Hauterivian*): UK (England). *Upper Cretaceous* (*Maastrichtian*): Senegal. *Paleocene*: India. *Eocene* (*Bartonian*): UK (England). *Eocene:* Egypt, India, The Netherlands, Pakistan, Romania, UK (England).——Fig. 7,*4*. *Goniocypoda tessieri* Remy in Remy & Tessier, 1954, KSU 1103, cast of MNHN RO 3384, Maastrichtian, Senegal, scale bar, 1 cm (new).

Headonipus Quayle & Collins, 2012, p. 40 [**H. tuberculatus,* p. 40, pl. 3,*9–10;* OD]. Carapace wider than long, apparently widest about two-thirds the distance posteriorly; front wide, orbits deep, fronto-orbital margin occupying entire frontal margin of carapace; mesogastric region defined posteriorly, cardiac region defined anteriorly; carapace densely granular overall. *Eocene* (*Priabonian*): UK (England).——Fig 7,*5*. **H. tuberculatus,* holotype NHMUK IC 607, scale bar, 5 cm (new; photo by J. Quayle, England, UK).

Hexapinus Manning & Holthuis, 1981, p. 169 [**Hexapus latipes* De Haan, 1835 in 1833–1850, pl. D; OD]. Carapace broader than long; regions not demarcated except for poorly defined cardiac region; anterolateral margin arcuate, posterolateral margin sinuous; ischium of maxilliped 3 strongly expanded mesially, exopod broad; P2–P4 short without longitudinal groove on outer surface of merus; male pleon relatively long, slender, extending beyond bases of maxilliped 3, moderately narrow; somites 3–5 fused, narrow; somite 6 slightly shorter than fused somites 3–5; telson subpentagonal with rounded distal margin; G1 gently curved. [Emended from Rahayu & Ng, 2014, p. 407.] *Miocene–Holocene. Miocene:* Japan, India. *Holocene:* Indonesia, Singapore, Philippines, Japan, South China Sea.——Fig. 7,*6*. **H. latipes* (De Haan), MFM 129118, Holocene fossil, Japan, scale bar, 1 cm (new).

Hexapus De Haan, 1833 in 1833–1850, p. 5 [**Cancer sexpes* Fabricius, 1798, p. 344; M]. Carapace widening posteriorly; branchiocardiac groove weakly developed; front straight, not projecting beyond orbits; orbits small, rimmed, directed forward, fronto-orbital width about one-third maximum width; lateral margins with beaded rim; posterior margin ~90% maximum carapace width; sternal grooves deep. [Emended from Schweitzer & Feldmann, 2001, p. 335.] *Eocene–Holocene. Eocene* (*Bartonian*): Pakistan. *Miocene:* Japan, Sabah, Sarawak. *Pliocene:* Brunei. *Pleistocene:* Philippines. *Holocene:* Indo-Pacific Ocean.——Fig. 7,*7*. *H. nakajimai* Imaizumi, 1959, KSU 1938, cast of holotype IGPS 79466, Miocene, Japan, scale bar, 1 cm (new).

Holthuisea Guinot, De Angeli, & Garassino, 2010, p. 289 [**Stevea cesarii* Beschin, Busulini, De Angeli, & Tessier, 1994, p. 192, fig. 8, pl. 10,*1, 3–5;* OD]. Carapace wider than long, ovate-rectangular; front broadly bilobed; orbits rimmed; lateral margins rimmed; posterior margin very wide; male pleon narrow, with sinuous lateral margins; somite 2 short; somites 3–5 fused, entire unit narrowing distally, somite 3 widening distally, somite 4 with

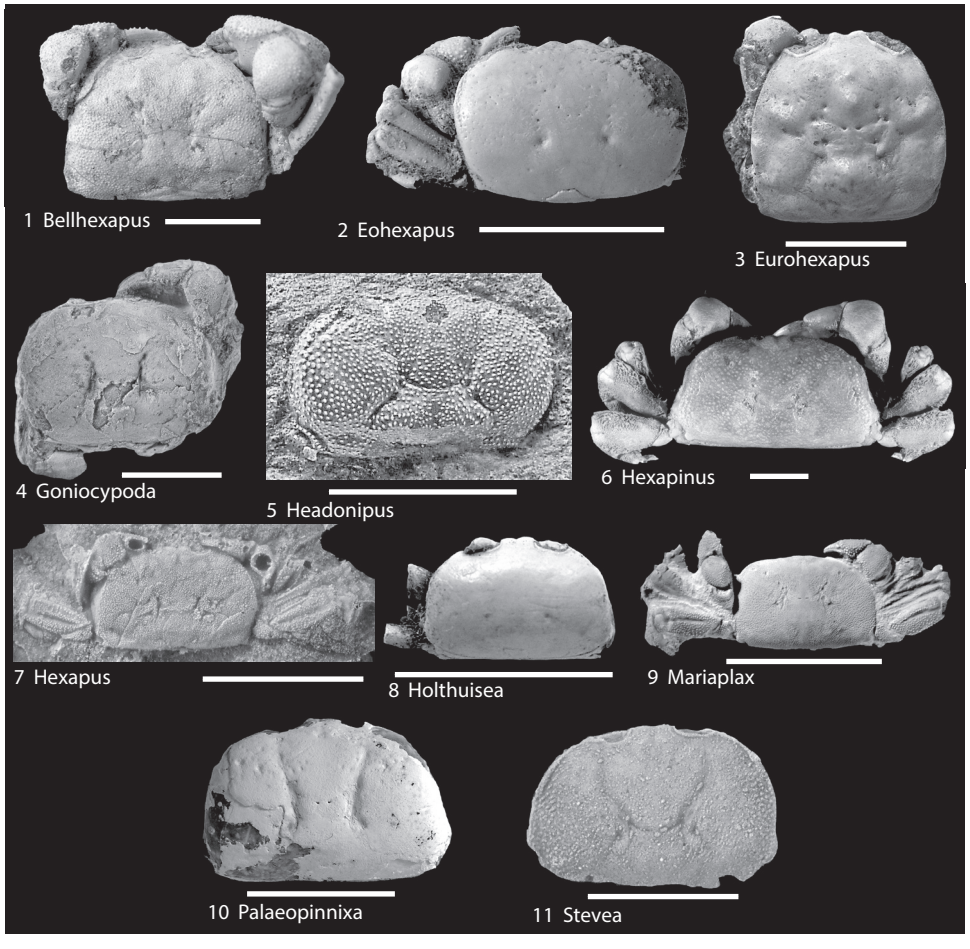

FIG 7. Hexapodidae (p. 16–18).

concave lateral margins, somite 5 with concave lateral margins, narrowing distally; somite 6 as long as wide; female pleon broadly triangular, narrowing distally, all somites free. *Eocene* (*Ypresian, Lutetian*): Italy.——FIG. 7,*8*. **H. cesarii* (BESCHIN, BUSULINI, DE ANGELI, & TESSIER), MCZ 3000-I.G. 336821, Eocene, Italy, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Mariaplax RAHAYU & NG, 2014, p. 423 [**Lambdophallus anfractus* RATHBUN, 1909, p. 113; OD]. Carapace widening posteriorly; branchiocardiac groove weakly developed; front straight, not projecting beyond orbits; orbits small, rimmed, directed forward, fronto-orbital width about one-third maximum width; lateral margins with beaded rim; posterior margin ~90% maximum carapace width; male telson shorter than 6th pleonal somite; pereiopods 2–4 with longitudinal groove on outer surface of merus; sternite 8 visible. *Pleistocene–Holocene. Pleistocene:* Japan. *Holocene:* Indo-Pacific Ocean, Australia.——FIG. 7,*9*. **M. anfractus* (RATHBUN), MFM 142161-2, Pleistocene, Japan, scale bar, 1 cm (new).

Palaeopinnixa VÍA, 1966, p. 2 [**P. rathbunae* SCHWEITZER, FELDMANN, TUCKER, & BERGLUND, 2000, p. 57; =*Pinnixa eocenica* RATHBUN, 1926, p. 34, pl. 1,*3–4* (preoccupied name); OD]. Carapace widest just anterior to posterolateral reentrants; rounded-rectangular to ovoid, narrowing weakly anteriorly; front extending well beyond orbits; orbits wider than high, moderately deeply excavated; fronto-orbital width slightly more than half maximum carapace width; lateral rim absent or weakly developed; posterolateral reentrant well developed; unique in family in having third pereiopod longest. [Emended from SCHWEITZER & FELDMANN, 2001, p. 336.] *Paleocene* (*Danian*): Argentina. *Eocene* (*Lutetian*): USA (California). *Priabonian:* Italy. *Eocene:* Barbados, Peru, Venezuela,

USA (Oregon, Washington). *Oligocene:* Kyrgyzstan. *Miocene:* Colombia, Mexico (Chiapas), Panama, Trinidad, Spain.——Fig. 7,*10*. *Palaeopinnixa alontensis* De Angeli, Guinot, & Garassino, 2010, holotype MCZ 3002-I.G. 336832, Priabonian, Italy, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Stevea Manning & Holthuis, 1981, p. 177 [*Hexapus williamsi* Glassell, 1938, p. 177; OD]. Carapace wider than long, subrectangular; front depressed, with concave border, widening distally; anterolateral margin converging anteriorly; posterolateral margins short, slightly convex; dorsal surface convex longitudinally; cervical and branchiocardiac grooves faint; two round branchio-cardiac depressions; pterygostomian region with row of oblique striae; propodus of maxilliped 3 not strongly widened distally, slender, carpus and dactylus relatively slender; male pleon with three free somites, 2–6 fused; female pleon long, narrow; somite 1 free, somites 2–6 fused, with sutures still distinct on lateral sides. [Emended from Manning & Holthuis, 1981, p. 177; Guinot, De Angeli, & Garassino, 2010, p. 285.] *Paleocene–Holocene. Lower Paleocene:* Alabama, USA. *Holocene:* Guatemala, west coast of Brazil.——Fig. 7,*11*. **S. martini,* Feldmann, Schweitzer & Portell, 2014, p. 142, KSU D 2239, cast of holotype, UF 228988, Paleocene, Alabama, scale bar, 1 cm (new).

ABBREVIATIONS FOR MUSEUM REPOSITORIES

BSP: Bayerische Staatsammlung für Paläontologie und historische Geologie München (Munich), Germany
CBM: Natural History Museum and Institute, Chiba, Japan
CM: Canterbury Museum, Christchurch, New Zealand
CPC: Colección de Paleontología, Museo del Desierto, Saltillo, Coahuila, Mexico
GBA: Geologische Bundesanstalt (Geological Survey of Austria), Vienna, Austria
GHUNLPam: Cátedra de Geología Histórica, Facultad de Ciencias Exactas y Naturales, Universidad Nacional de La Pampa, Santa Rosa, Argentina
GSP-UM: Geological Survey of Pakistan-University of Michigan, Islamabad and Ann Arbor
IGPS: Institute of Geology and Paleontology, Tohoku University, Sendai, Japan
IHNCH: Instituto de Historia Natural de Chiapas, Tuxtla Gutiérrez, Chiapas, Mexico.
KSU D: Decapod Comparative Collection, Department of Geology, Kent State University, Kent, Ohio, USA
M: Hungarian Natural History Museum, Budapest, Hungary
MAFI: Földani Intézet (Hungarian Geological Survey), Budapest, Hungary
MBA: Humboldt-Universitat zu Berlin Museum, Berlin, Germany
MCZ: Museo Civico "G. Zannato" di Montecchio Maggiore, Vicenza, Italy
MFM: Mizunami Fossil Museum, Mizunami, Gifu, Japan
MGSB: Museo Geológico del Seminario de Barcelona, Barcelona, Spain
MGUS: Museo Geológico, Universidad de Sevilla, Spain
MHM: Museum Mors, Denmark
MHN-UABCS: Museo de Historia Natural, Universidad Autónoma de Baja California Sur, La Paz, Mexico
MNHN: Muséum National d'histoire naturelle, Paris, Collection of Marine Invertebrates, France
MNHN.F: Muséum National d'histoire naturelle, Paris, Collection de Paléontologie, France
MPZ: Museo Paleontológico de la Universidad de Zaragoza, Spain
MSNM: Museo Civico di Storia Naturale di Milano, Italy
NBCN: Naturalis Biodiversity Center, Leiden, The Netherlands
NHMUK: Palaeontology Collections, The Natural History Museum, London, UK
NMCR: Philippine National Museum, Manila, Philippines
OUMNCH: University of Oregon Museum of Natural and Cultural History, Condon Collection, Eugene, Oregon, USA
PU: Museo Regionale di Scienze Naturali, Torino, Italy
RGM: Naturalis Biodiversity Center, Leiden, The Netherlands
T: Bruce Theil Collection, Portland, Oregon, USA
UF: Florida Museum, University of Florida, Gainesville, Florida, USA
ULLZ: University of Louisiana at Lafayette Zoological Collection, Louisiana, USA
USNM: United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA
VR: Museo di Storia naturale di Verona, Italy

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