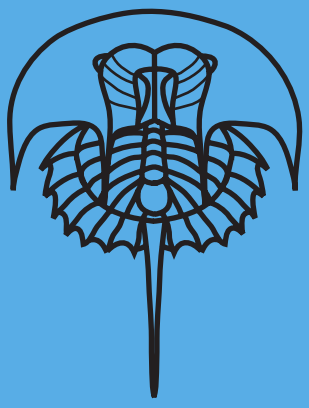

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## Part R, Revised, Volume 1, Chapter 8T3: Systematic Descriptions: Superfamily Leucosioidea

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# PART R, REVISED, VOLUME 1, CHAPTER 8T3: SYSTEMATIC DESCRIPTIONS: SUPERFAMILY LEUCOSIOIDEA

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## Superfamily LEUCOSIOIDEA Samouelle, 1819

[*nom. transl.* Galil, 2001, p. 266, *pro* Leucosiadae Samouelle, 1819, p. 91]

Carapace generally ovate but variable in shape; regions usually poorly defined; cephalic regions compressed so that cephalic area of carapace shortened; sternum wide, all sutures 4/5–7/8 interrupted; sterno-pleonal cavity deeply excavated; eyes and orbits small; chelae symmetrical. *Eocene (Ypresian–Holocene).*

## Family IPHICULIDAE Alcock, 1896

[*nom. transl.* Ng, Guinot, & Davie, 2008, p. 87, *ex* Iphiculoida Alcock, 1896, p. 167]

Carapace ovate, wider than long or longer than wide; regions undefined except urogastric and cardiac; all female and male pleonal somites free, relatively narrow and flat in females; sterno-pleonal cavity shallower than other families, brood cavity incomplete; mani of chelipeds bulbous, fingers long, slender, with spines on occlusal surfaces of alternating lengths. *Miocene–Holocene.*

**Iphiculus** Adams & White, 1849, p. 57 [**I. spongiosus;* M, ICZN Opinion 73, 1941; ICZN Direction 37, 1956a]. Carapace transversely oval, much wider than long; front narrow, bilobed; anterolateral margin with four sharp spines; posterolateral margin with two tubercles; posterior margin with tubercles on each side; dorsal surface convex, tuberculate, with hairs; regions hardly defined except intestinal region, which is well defined; pleonal somites 3–4 in males fused, but distinct in females; chelipeds slender with short palm; occlusal margin of fingers with needlelike teeth. *Miocene–Holocene:* Austria, Malaysia (Sabah, Sarawak), *Miocene;* Brunei, *Pliocene;* Taiwan, *Pleistocene;* Indo-West Pacific region, *Holocene.*——Fig. 1,*1a–b.* **I. spongiosus,* USNM 1462689, Holocene; *a*, dorsal carapace; *b,* ventral surface, scale bars, 1 cm (new).

**Pariphiculus** Alcock, 1896, p. 257 [**Randallia coronata* Alcock & Anderson, 1894, p. 177; SD Rathbun, 1922, ICZN Opinion 73, 1941; ICZN Direction 37, 1956a]. Carapace circular; front narrow, bilobed; lateral and posterior margins more or less spinose; dorsal surface strongly convex with hairs; regions hardly defined, with only intestinal region well defined; pleonal somites 3–5 fused in males, but distinct in females; chelipeds slender with short palm; occlusal margin of fingers with needlelike teeth. *Miocene–Holocene:* Iran, Malaysia (Sabah, Sarawak), Indonesia (Java), *Pliocene;* Brunei, Malaysia (Sarawak), Japan, Indo-West Pacific region, *Holocene.*——Fig. 1,*2a–b.* **P. coronatus* (Alcock & Anderson), USNM 65422, Holocene, Philippines; *a*, dorsal carapace; *b*, male ventral surface, scale bars, 1 cm (new).

## Family LEUCOSIIDAE Samouelle, 1819

[*nom. correct.* Leucosiadae Samouelle, 1819, p. 9; ICZN Opinion 712, 1964, p. 341]

Cephalic region shortened, carapace generally ovate but may have highly ornamented margins; sternum broad, all sutures 4/5–7/8 interrupted, sterno-pleonal cavity deep, rimmed anteriorly to accommodate abdomen; female abdomen with marked fusion of somites to form dome-like brood pouch; ischio-basis fused to merus in chelipeds. According to Ng, Guinot, and Davie (2008, p. 88), subfamily divisions are in flux and in need of revision. *Eocene–Holocene.*

### Subfamily CRYPTOCNEMINAE Stimpson, 1907

[*nom. transl.* Serène, 1968, p. 48, *ex* Cryptocnemidae Stimpson, 1907, p. 161] [=Leuciscini Števčić, 2005, p. 110; =Lissomorphini Števčić, 2005, p. 114; =Onychomorphini Števčić, 2005, p. 111]

Carapace flattened, expanded so much as to conceal pereiopods, with lamelliform margins; orbits small, deep; infraorbital lobe large, well developed; anterior margin of buccal cavity not

Karasawa, Hiroaki, Carrie E. Schweitzer, & Rodney M. Feldmann. 2019. Part R, Revised, Volume 1, Chapter 8T3: Systematic descriptions: Superfamily Leucosioidea. Treatise Online 115:1–22, 14 fig.

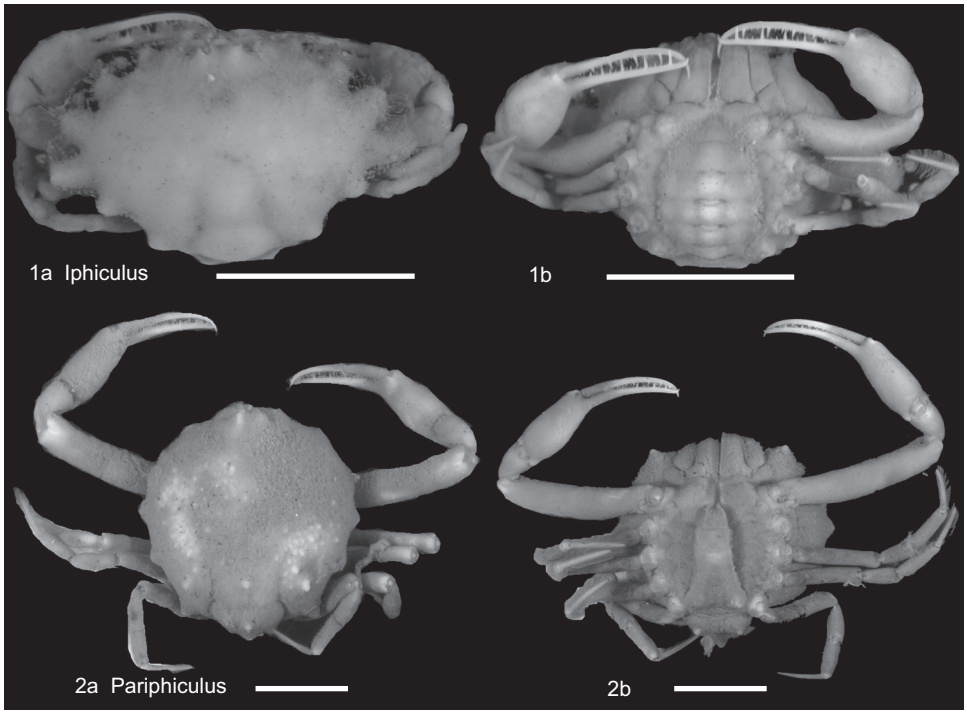


FIG. 1. Family Iphiculidae (p. 1).

projecting much beyond anterior boundary of pterygostomial region; merus of maxilliped 3 at least half the length of ischium; anterior chelipeds large, strongly depressed; male pleon with fused somites. *Pleistocene–Holocene.*

**Cryptocnemus** STIMPSON, 1858, p. 60 [**C. pentagonus;* M]. Carapace ovate, about as wide as long or wider than long, smooth; front bilobed, orbits small; posterior margin of carapace lamelliform, crispate. *Pleistocene–Holocene:* Japan, *Pleistocene;* Australia, Indo-Pacific Oceans, Red Sea, *Holocene*.——FIG. 2,*1a–b*. *C. obolus* ORTMANN, 1892, USNM 134199, Holocene, Japan; *a*, dorsal carapace; *b*, ventral view, scale bars, 1 cm (new).

## Subfamily EBALIINAE Stimpson, 1871

[Ebaliinae STIMPSON, 1871a, p. 159] [=Iliinae STIMPSON, 1871a, p. 155; =Myrodinae MIERS, 1886, p. 297; =Oreophorinae MIERS, 1886, p. 297; =Myroida ALCOCK, 1896, p. 167; =Nucioida ALCOCK, 1896, p. 167; =Nursilioida ALCOCK, 1896, p. 167; =Philyrinae RATHBUN, 1937, p. 151; =Arcaniini ŠTEVČIĆ, 2005, p. 113; =Ixini ŠTEVČIĆ, 2005, p. 113; =Pariliini ŠTEVČIĆ, 2005, p. 112; =Persephonini ŠTEVČIĆ, 2005, p. 112; =Randalliini ŠTEVČIĆ, 2005, p. 112; =Ihleini ŠTEVČIĆ, 2011, p. 130; =Coralliocryptini ŠTEVČIĆ, 2013, p. 187]

Carapace polygonal, uneven, nodular or eroded; infraorbital lobe and epistome well developed; anterior margin of buccal cavity projecting beyond anterior margin of pterygostomial region; merus of maxilliped 3 at least half length of ischium; chelipeds moderate length; fingers not very thin and elongate. *Eocene–Holocene.*

**Ebalia** LEACH, 1817, pl. 25,*12–13* caption [**E. bryerii;* SD H. MILNE EDWARDS, 1837 in 1836–1844, pl. 24,*3,* see MANNING & HOLTHUIS, 1981, p. 60; =*E. edwardsii* O. G. COSTA, 1838 in COSTA & COSTA, 1838–1871, p. 7, pl. 3,*3;* =*E. algirica* LUCAS, 1846, p. 23, pl. 2,*7;* =*E. ambigua* BOUVIER, 1940, p. 210, fig. 144] [=*Phlyxia* BELL, 1855, p. 303, pl. 34,*1* (type, *P. crassipes,* SD RATHBUN, 1922, ICZN Opinion 73, 1941; ICZN Direction 37, 1956a)]. Carapace ovate, longer than wide, regions well defined for family; front with two broad or four narrower spines; anterolateral margin variously ornamented; posterior margin straight or with one or three spines; pleonal somites 3–6 or 3–5 fused; male telson may have spine overlapping onto somite 6. *Eocene (Priabonian)–Holocene:* Uzbekistan, *Priabonian;* Germany, *Eocene–Oligocene;* Italy, *Burdigalian;* Spain, *Langhian;* Greece, Hungary, *Langhian–Serravallian;* Austria, *Tortonian;* Greece, *Messinian*; Iran, Myanmar, *Miocene;* Belgium, Italy, UK (England), Japan, *Piacenzian;* Italy, Japan, *Pliocene;* Italy, Japan, Taiwan, *Pleis-*

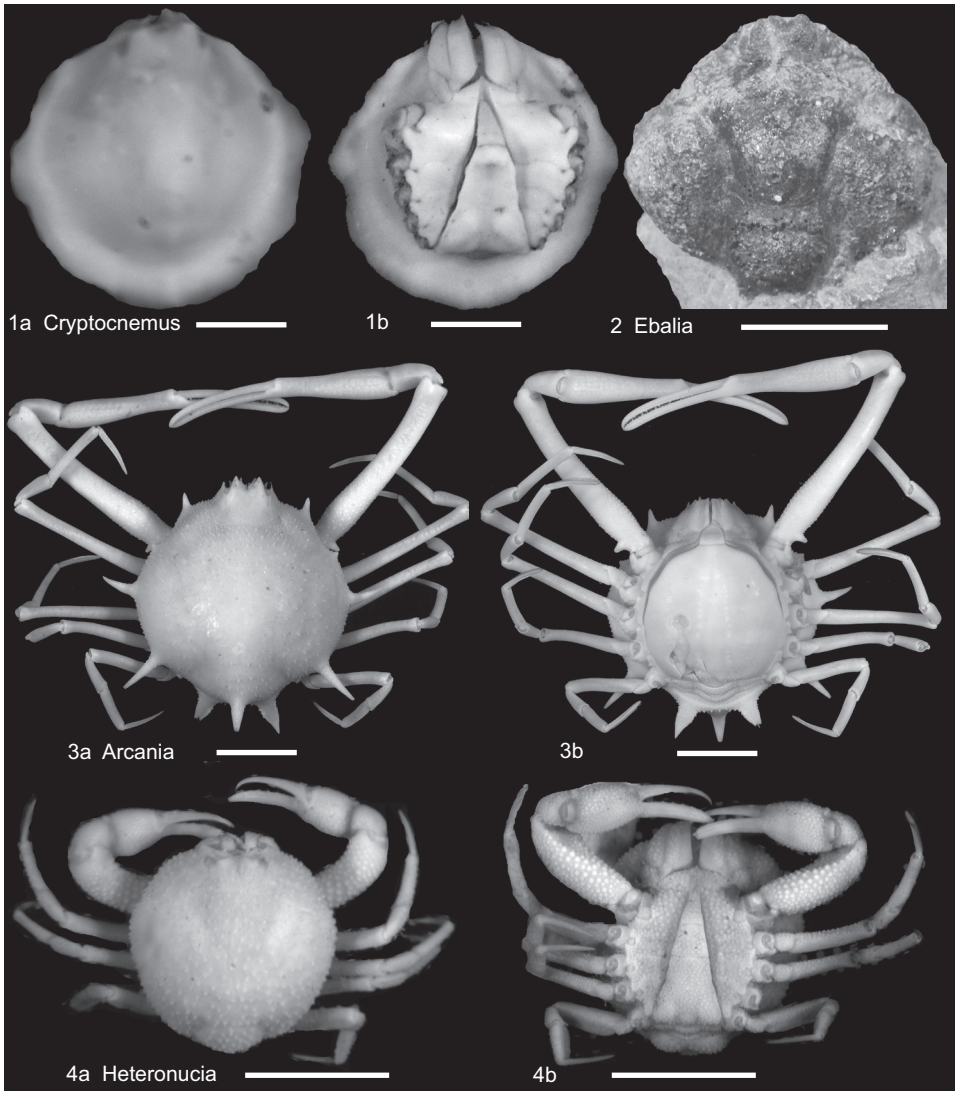


FIG. 2. Family Leucosiidae (p. 2–4).

*tocene;* Cosmopolitan, *Holocene.*——FIG. 2,*2. E. vahldieki* FÖRSTER & MUNDLOS, 1982, holotype, BSP 1981 XI 14, upper Eocene–lower Oligocene, Germany, scale bar, 1 cm (new).

**Arcania** LEACH, 1817 in 1814–1817, p. 24 [**Cancer erinaceus* FABRICIUS, 1787, p. 325; M, ICZN Opinion 73, 1941] [=*Iphis* LEACH, 1817 in 1814–1817, p. 25 (type, *Cancer septemspinosus* FABRICIUS, 1787, p. 325, M, ICZN Opinion 73, 1941; ICZN Direction 49, 1956b); =*Ixoides* MACGILCHRIST, 1905, p. 255 (type, *I. cornutus*, M)]. Carapace subcircular, oval or rhomboidal; front bilobed; lateral margins smooth, granular, or with large spines; posterior margin with two or three spines, median one sometimes longest; dorsal surface strongly convex, granular or spinose; regions hardly defined; infraorbital lobe prominent; anterior margin of pterygostomial region with two prominent teeth; epistome very small; abdomen with somites 3–5 in males and somites 3–6 or 4–6 in females fused; chelipeds slender, elongate. *Miocene–Holocene:* Iran, Java, Taiwan, *Miocene;* Java, Taiwan, *Pliocene;* Japan, Taiwan, *Pleistocene; Holocene:* Indo-West Pacific region.——FIG. 2,*3a–b. A. novemspinosa* (LICHTENSTEIN, 1816), USNM 273770, Holocene, Thailand; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

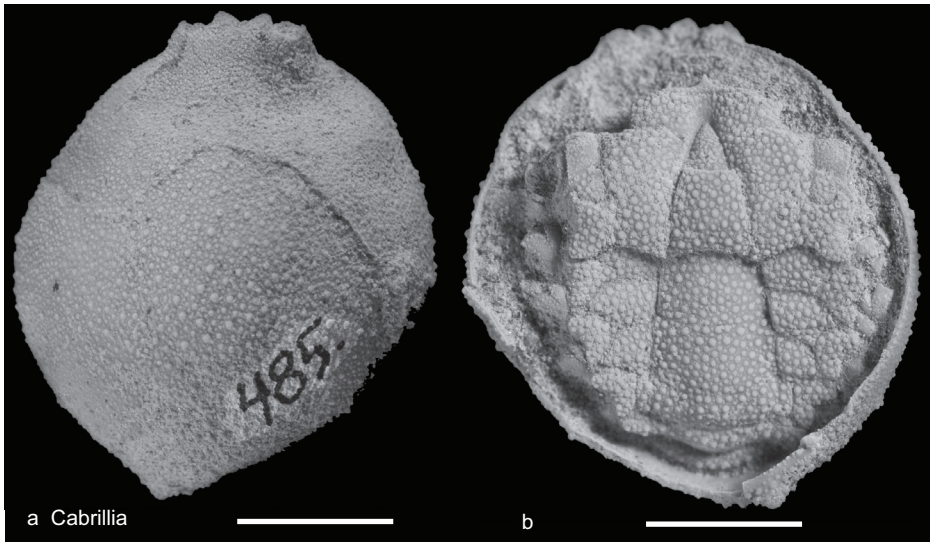


Fig. 3. Family Leucosiidae (p. 4).

**Cabrillia** Nyborg, Pasini, & Garassino, 2018, p. 18–20, fig. 2–3 [**C. hendyi;* M]. Carapace subhexagonal, rounded with two lateral projections on posterior margin; dorsal carapace bearing coarse, tiny granulations, interspersed with alternating subequal, pearliform or beaded tubercles; short, bidentate front slightly forwardly projected; rounded small orbits frontally directed and parallel, with very small postorbital triangular spine; supraorbital fissures absent; dorsal regions poorly defined; rounded bulge on intestinal region; male pleon with sternites and coxae with alternating, subequal, pearliform or beaded tubercles; sternum elongate subtriangular, narrow; pleonal somite 1 short; pleonal somite 2 narrow, transversely; pleonal somites 3–5 unfused; pleonal somite 6 subtrapezoidal; telson triangular. [Emended from Nyborg, Pasini, & Garassino, 2018, p. 18.] *upper Pliocene–lower Pleistocene:* USA (California).——Fig. 3*a–b*. **C. hendyi,* holotype, LACMIP 14772; *a*, dorsal carapace; *b*, ventral surface, scale bars, 1 cm (Nyborg, Pasini, & Garassino, 2018, fig. 2A–B).

**Heteronucia** Alcock, 1896, p. 177, pl. 8,*1* [**H. vesiculosa;* M]. Carapace rhomboid; front nearly straight or broadly sulcate axially; orbits deep, narrow, with two fissures; anterolateral margins with broad swellings and smaller granules; posterolateral margins with blunt spine anterior to posterolateral corner; posterior margin with two broad spines; cardiac region very inflated, sometimes extending beyond posterior margin; carapace surface with swellings in protogastric, mesogastric, and branchial regions; male pleonal somites 3–5 fused. *Pleistocene–Holocene:* Japan, *Pleistocene;* Indo-Pacific Oceans, Australia, eastern Africa, *Holocene.*——Fig. 2,*4a–b*. *H. laminata* (Doflein, 1904), USNM 1455318, Holocene; *a*, dorsal carapace; *b*, ventral surface, scale bars, 1 cm (new).

**Hiplyra** Galil, 2009, p. 291 [**Philyra platycheir* de Haan, 1841 in 1833–1850, p. 132, pl. 33,*6;* OD]. Carapace circular, narrowing anteriorly; regions poorly defined; branchiocardiac groove well marked; front produced beyond orbit and downturned; orbits with one fissure; inner margin of chelae smooth; male pleonal somites 2–6 fused. *Pleistocene–Holocene:* Japan, Taiwan, *Pleistocene;* Australia, Indian Ocean; Indo-Pacific Oceans, Red Sea, Mediterranean Sea, *Holocene.*——Fig. 4,*1a–b*. **H. platycheir* (de Haan), MFM129112, Holocene, male, Mikawa Bay, Japan; dorsal *(a)* and ventral (*b*) views, scale bars, 5 mm (new).

**Ilia** Leach, 1817 in 1814–1817, p. 24 [**Cancer nucleus* Linnaeus, 1758, p. 627; M, ICZN Opinion 712, 1964; =*Cancer orbicularius* Olivi, 1792, p. 47; =*Ilia laevigata* Risso, 1827, p. 20; =*Ilia rugulosa* Risso, 1827, p. 20; =*Ilia parvicauda* O. G. Costa, 1853 in Costa & Costa, 1838–1871, p. 8] [=*Thaumasta* Gistel, 1848, p. ix, unnecessary replacement name]. Carapace round; front produced beyond orbits, bilobed; small anterolateral spine corresponding to position of hepatic region; long posterolateral spine; posterior margin with two spines. *Eocene (Ypresian–Lutetian)–Holocene:* Italy, *Zanclean–Piacenzian, Pleistocene;* Mediterranean Sea, western Africa, *Holocene*.——Fig. 4,*2a–b*. **I. nucleus* (Linnaeus), USNM 258057, Holocene, Mediterranean Sea; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Iliacantha** Stimpson, 1871a, p. 155 [**I. subglobosa;* SD Rathbun, 1922, ICZN Opinion 73, 1941; ICZN Direction 37, 1956a]. Front narrow, produced beyond remainder of carapace; lateral margins entire,

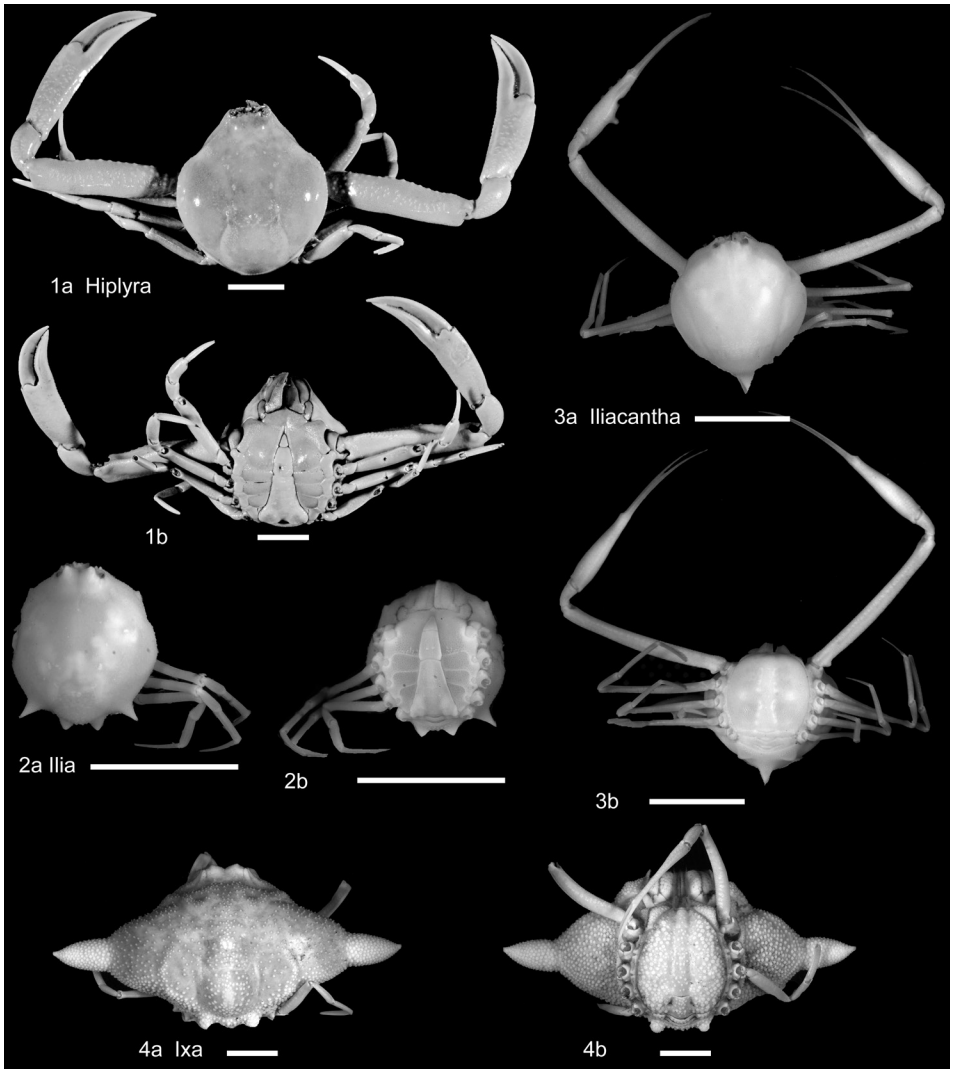


FIG. 4. Family Leucosiidae (p. 4–5).

with convexity in anterolateral portion that may be produced into a spine; posterior margin with three spines, central spine longest; chelipeds long, slender. *Miocene (Tortonian)–Holocene:* Panama, *Tortonian–Messinian;* Cuba, Mexico (Chiapas), *Miocene;* Caribbean region, western Atlantic Ocean, west Africa, *Holocene.*——FIG. 4,*3a–b. *I. subglobosa,* USNM 154416, Holocene, Puerto Rico; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Ixa** LEACH, 1816, p. 310 [**Cancer cylindrus* FABRICIUS, 1777, p. 248; M, ICZN Opinion 73, 1941; =*Ixa canaliculata* LEACH, 1817 in 1814–1817, p. 26, pl. 129,*1*]. Carapace hexagonal with very strong, cylindrical spines at anterolateral corner, dorsal surface granular, axial regions bounded by deep groove; front notched; posterior margin with blunt spines at each corner. *Cenozoic–Holocene:* Chile, *Cenozoic;* India, *Pleistocene;* Indo-Pacific region, Australia, Red Sea, Mediterranean Sea, eastern Africa, *Holocene.*——FIG. 4,*4a–b. I. edwardsii* LUCAS, 1858, USNM 273746, Holocene, Philippines; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Leucosilia** BELL, 1855, p. 295 [**Guaia (Ilia) jurinei* SAUSSURE, 1853, p. 365; M, ICZN Opinion 73, 1941; ICZN Direction 37, 1956a]. Front bilobed, sulcus between orbits; lateral margins with convex protuberance anterolaterally; posterior margin with central spine or swelling; hepatic region with

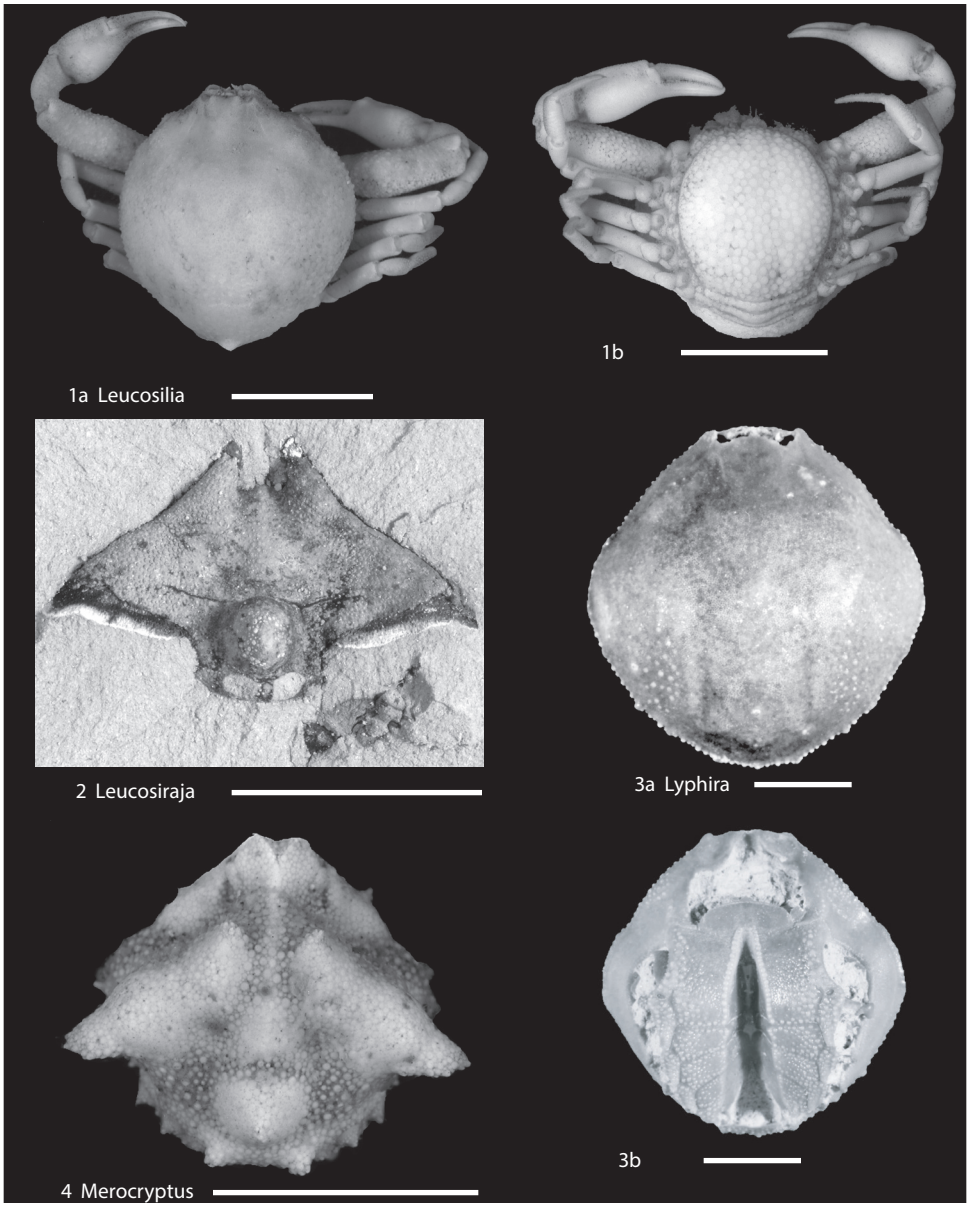


FIG. 5. Family Leucosiidae (p. 5–7).

swelling; carapace surface covered with tubercles that increase in size posteriorly. *Miocene–Holocene:* Costa Rica, *Miocene;* Panama, *Pleistocene;* Caribbean region, Indo-Pacific region, *Holocene.*——FIG. 5,*1a–b*. **L. jurinei* (SAUSSURE), USNM Acc. No. 161887, Holocene, Panama; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Leucosiraja** DE ANGELI, GARASSINO, & PASINI in BALDANZA & others, 2017, p. 53, fig. 11A–C [**L. manta;* OD]. Carapace subtriangular, much wider than long; frontal margin subtriangular; supraorbital angle inflated, forming elongate hornlike tubercles; gastro-cardiac rim tapering anteriorly; cardiac tubercle strongly rounded; hepatic region subtriangular, inflated; branchial region expanded laterally, forming an acutely triangular, winglike, outwardly directed, gently sinuous surface; intestinal region protruding posteriorly; dorsal surface

covered by rounded, flattened granules, depressed medially; hepatobranchial notch separating hepatic region from epibranchial margin; lateral margins strongly divergent posteriorly, finely serrated; mesobranchial margin slightly sinuous, metabranchial margin concave and extended abruptly toward the posteriorly projected, convex posterior margin. *lower Pleistocene:* Italy.——Fig. 5,*2*. **L. manta,* holotype, MUSNAF 7101, Pleistocene, Italy, scale bar, 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Lyphira** Galil, 2009, p. 300 [**Philyra heterograna* Ortmann, 1892, p. 582, pl. 26,*17;* OD; =*P. peitahoensis* Shen, 1932, p. 18, pl. 1,*1–2,* fig. 10–12, 16b; =*P. acutidens* Chen, 1987, p. 195, fig. 1]. Carapace circular, regions poorly defined except for moderately defined axial regions, epigastric regions slightly lower than remainder of carapace; inner margins of chelae with tubercle; male pleonites 2–6 fused, female pleonites 3–6 fused. ?*Pliocene–Holocene:* Philippines, ?*Pliocene;* Japan, *Pleistocene;* Indo-Pacific region, *Holocene.*——Fig. 5,*3a–b*. **L. heterograna* (Ortmann), MFM142407, male, Holocene (fossil), Japan; dorsal (*a*) and ventral (*b*) views, scale bars, 5 mm (new).

**Merocryptus** A. Milne-Edwards, 1873, p. 84–85, pl. 13,*1* [**M. lambriformis;* M, ICZN Opinion 73, 1941]. Carapace angular, with marked projections laterally; orbits small, closely spaced; with spines on anterolateral margins; posterior margins with projections. *Oligocene (Rupelian)–Holocene:* Italy, *Rupelian, Upper Pleistocene;* Indo-Pacific and Atlantic Oceans, Mediterranean Sea, *Holocene.*——Fig. 5,*4*. **M. lambriformis,* USNM 134203, Holocene, Japan, scale bar, 1 cm (new).

**Myra** Leach, 1817 in 1814–1817, p. 19 [**Leucosia fugax* Fabricius, 1798, p. 351; M, ICZN Opinion 712, 1964; =*M. carinata* Bell, 1855, p. 297; =*M. pentacantha* Alcock, 1896, p. 204; =*M. longimerus* Chen & Türkay, 2001, p. 249, fig. 7] [=*Myrodes* Bell, 1855, p. 298 (type, *M. eudactylus,* p. 299, pl. 32,*6,* M; ICZN Opinion 73, 1941; ICZN Direction 37, 1956a)]. Carapace ovoid or subglobular; front narrow, bidentate; posterior margin with three spines, median one longest; dorsal surface strongly convex, smooth or granular, with poorly defined regions; subhepatic facet distinct; anterior margin of pterygostomial region tridentate; epistome very small; abdomen with somites 3–6 in male and somites 3–6 or 4–6 in female fused; chelipeds slender, elongate. *Miocene (Burdigalian–Langhian)–Holocene:* Spain, *Burdigalian–Langhian;* Austria, *Langhian–Serravallian;* Austria, Iran, Java, Malaysia (Sabah), Taiwan, *Miocene;* Brunei, Fiji, Java, *Pliocene;* Guam, Japan, Taiwan, *Pleistocene;* Indo-West Pacific region, *Holocene.*——Fig. 6,*1a–b*. *M. celeris* Galil, 2001, KSU D 2603, Holocene, Japan; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).——Fig. 6,*1c*. *M. trispinosa* Morris & Collins, 1991, cast of RGM 231347, numbered KSU D 438, Pliocene, Brunei, dorsal carapace, scale bar, 1 cm (new).

**Myropsis** Stimpson, 1871a, p. 156–157 [**M. quinquespinosa;* M; =*M. constricta* A. Milne-Edwards, 1880, p. 21; =*M. goliath* A. Milne-Edwards, 1880, p. 21]. Carapace globular, narrowing anteriorly; posterior axial regions defined, remainder of carapace smooth; five posterior spines, including two posterolateral and one on posterior tip of carapace; male pleonal somites 2–6 fused; chelipeds not robust. [Emended from Rathbun, 1937, p. 164.] *Pliocene–Holocene:* Curaçao, *Pliocene;* Caribbean region, western Atlantic Ocean, *Holocene.*——Fig. 6,*2a–b*. **M. quinquespinosa,* USNM 123615, Holocene, Florida; dorsal (*a*) and ventral (*b*) views, scale bar, 1 cm (new).

**Nucia** Dana, 1852, p. 397 [**N. speciosa;* M, ICZN Opinion 73, 1941; =*Ebalia pfefferi* de Man, 1887, p. 390, pl. 17,*4*]. Carapace transversely oval, wider than long; front bilobed; lateral and posterior margin granular, sometimes tuberculate; dorsal surface strongly convex, covered with granules and tubercles; regions usually well defined; chelipeds short, stout; pereiopods stout. *Miocene–Holocene:* Brunei, India, Iran, Java, Malaysia (Sabah, Sarawak), *Miocene;* Brunei, *Pliocene;* Japan, *Pleistocene;* Indo-West Pacific region, *Holocene.*——Fig. 6,*3a–b*. *N. baripadensis* Bachmayer & Mohanti, 1973, cast of holotype, NHMW 1974/1645, numbered KSU D 515, Miocene, India; *a,* dorsal carapace; *b,* ventral view of sternum, scale bars, 1 cm (new).

**Nursia** Leach, 1817 in 1814–1817, p. 20 [**N. hardwickii;* M, ICZN 1941, Opinion 73; =*Cancer lar* Fabricius, 1793, p. 467; =*N. hardwickii* Leach, 1817 in 1814–1817, p. 20]. Carapace pentagonal, slightly wider than long; front protruded, straight or concave; lateral margins thin, expanded, often serrated; dorsal surface usually depressed, traversed by ridges radiating from center; regions poorly defined; abdomen three-segmented in male and four-segmented in female; chelipeds massive. *Miocene (Tortonian–Messinian)–Holocene:* Philippines, *Tortonian–Messinian;* Japan, *Pleistocene;* Indo-West Pacific region, *Holocene.*——Fig. 6,*4a–b*. *N. sinuata* Miers, 1877, USNM 63340, Holocene, Queensland, Australia; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Paranursia** Serène & Soh, 1976, p. 9 [**Nursia abbreviata* Bell, 1855, p. 308, pl. 34,*5;* OD]. Carapace obovate, triangular anteriorly, rounded posteriorly, flattened; axially weakly keeled; with swelling in anterolateral margin and anterolateral corner rounded; posterolateral margin convex; posterior margin straight; branchial regions inflated. *Miocene–Holocene:* India, *Miocene;* Indo-Pacific region, *Holocene.*——Fig. 6,*5a–b*. **P. abbreviata* (Bell), ZRC 2012.1001, Holocene, Singapore; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new; photos by N. K. Ng, National University of Singapore).

**Persephona** Leach, 1817 in 1814–1817, p. 22 [**P. latreillei;* SD Rathbun, 1922, ICZN Opinion 73, 1941; ICZN Direction 37, 1956a] [=*Guaia* H. Milne Edwards, 1837 in 1834–1840, p. 127 (type,

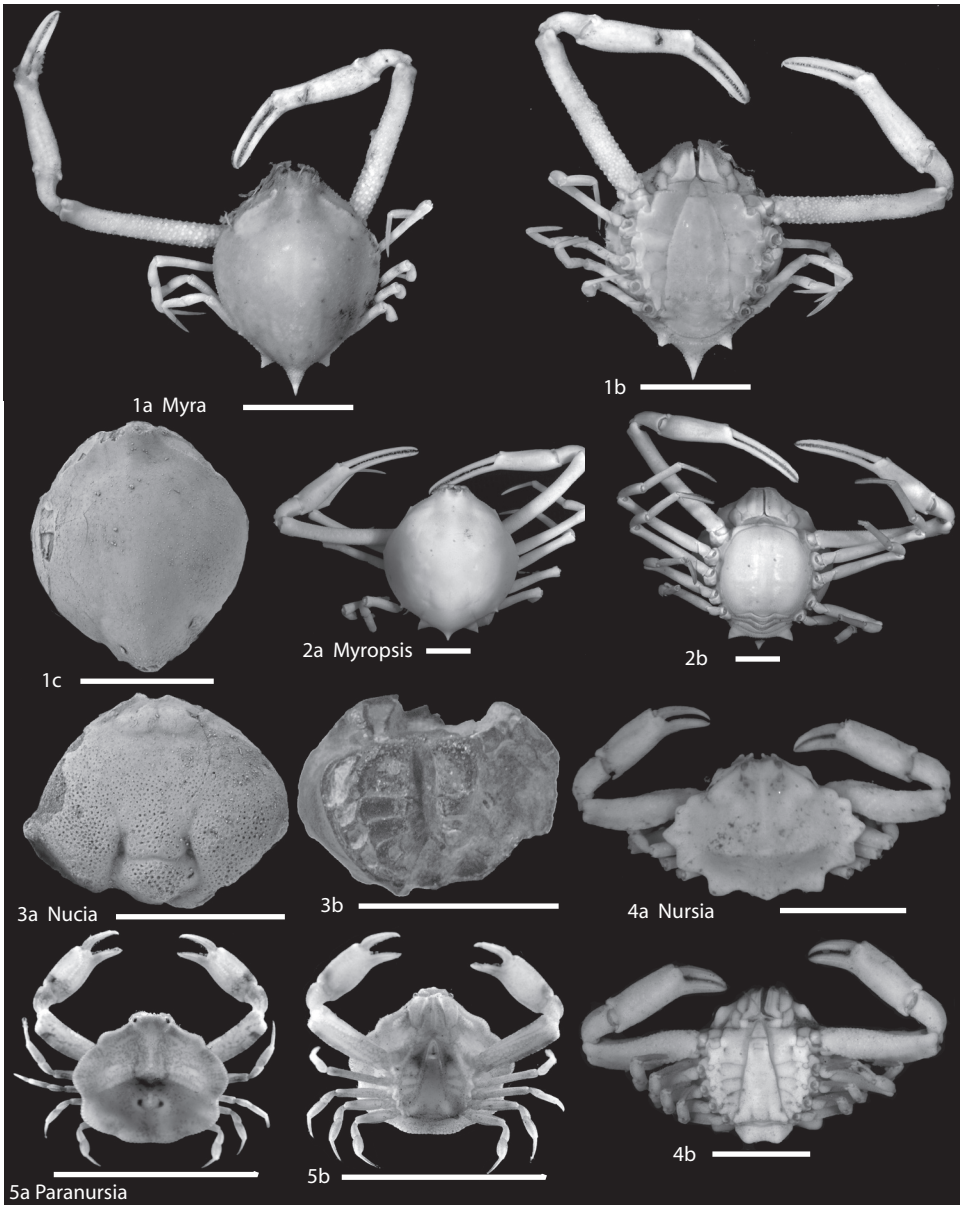


FIG. 6. Family Leucosiidae (p. 7).

*Cancer punctatus* LINNAEUS, 1758, p. 630, M)]. Carapace ovate; orbits very closely spaced; lateral margins entire or with one or two spines; posterior margin with three spines. *Oligocene–Holocene:* USA (Oregon), *Oligocene;* Dominican Republic, USA (North Carolina, South Carolina, Virginia), *Miocene;* Colombia, Panama, Jamaica, Trinidad, USA (California, North Carolina, South Carolina, Virginia), *Pliocene;* Jamaica, USA (Florida, Texas), *Pleistocene;* Caribbean region, western Atlantic Ocean, Gulf of California, Indo-Pacific region, *Holocene.*——FIG. 7,*1a–b*. *P. punctata* (LINNAEUS, 1758), USNM 2092, Holocene, Florida, USA; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Philyra** LEACH, 1817 in 1814–1817, p. 22 [**Cancer globus* FABRICIUS, 1775, p. 401; SD H. MILNE EDWARDS, 1837 in 1836–1844, pl. 24, ICZN Opinion 712, 1964; =*Cancer globulus* FABRICIUS, 1787, p. 315; =*Leucosia globulosa* BOSC, 1802, p. 238; =*P. globulosa* H. MILNE EDWARDS, 1837 in

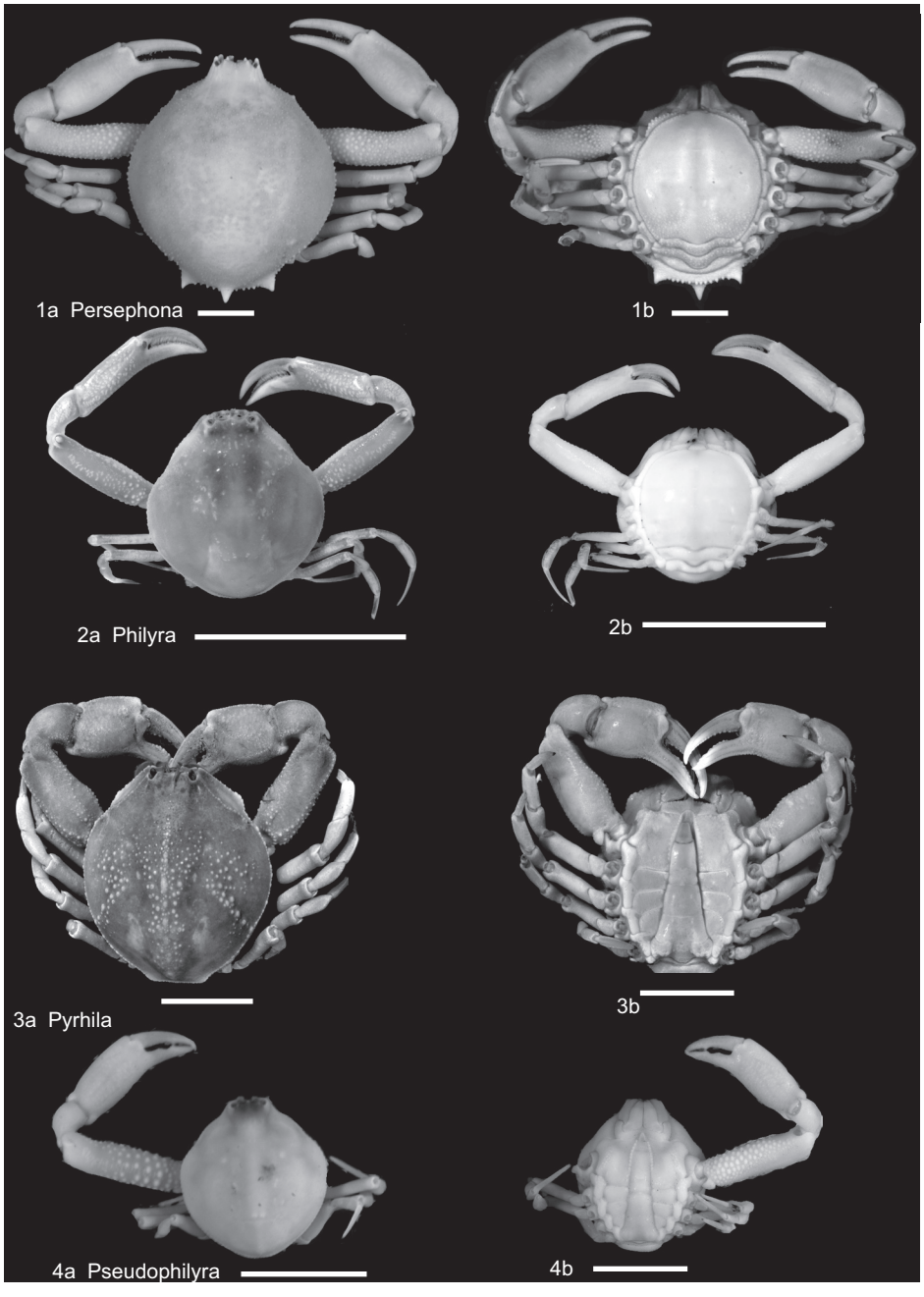


FIG. 7. Family Leucosiidae (p. 7–10).

1834–1840, p. 132; =*P. polita* HENDERSON, 1893, p. 401, pl. 38,*1–3*]. Carapace circular or subglobular; front relatively broad, sometimes bearing low median tooth; lateral and posterior margins usually granular; dorsal surface convex, smooth or granular with poorly defined regions; subhepatic facet distinct; anterior margin of pterygostomial region and buccal cavity projecting beyond front; epistome very small; abdomen with somites 2–5 in male and somites 3–6 in female fused; chelipeds robust or elongate. *Miocene (Langhian)–Holocene:* Japan, *Langhian;* Iran, *Langhian–Serravallian;* India, Iran,

Japan, Philippines, Malaysia (Sarawak), Taiwan, *Miocene;* Brunei, Japan, Philippines, Taiwan, *Pliocene;* China, Japan, Taiwan, *Pleistocene;* Indo-West Pacific region, western Africa, *Holocene.*——Fig. 7,*2a–b*. *P. syndactyla* Ortmann, 1892, KSU D 315, Holocene, Japan; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Pyrhila** Galil, 2009, p. 305 [**Philyra pisum* de Haan, 1841 in 1833–1850, p. 131, pl. 33,*7;* OD]. Carapace suborbiculate to globose; dorsal surface variably granulate; frontal region slightly produced, medially grooved; hepatic facet well defined; lateral and posterior margins irregularly beaded; second to sixth pleonal segments of male fused with lateral margin bearing three indistinct ridges fitting into sutures between sternal segments and lacking subterminal denticle. *Pleistocene–Holocene:* Japan, *Pleistocene;* western Pacific Ocean, *Holocene.*——Fig. 7,*3a–b*. **P. pisum* (de Haan), KSU D 326, Holocene, Japan, dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Pseudophilyra** Miers, 1879, p. 40–41, pl. 2,*4* [**P. tridentata;* SD Rathbun, 1922, p. 28, ICZN Opinion 73, 1941; ICZN Direction 37, 1956a; =*P. dinops* Takeda, 1977, p. 74, fig. 1, 4–5]. Carapace circular; front tridentate, projected well beyond epistome; lateral and posterior margins smooth; dorsal surface strongly convex, smooth, without subhepatic facet; regions usually not defined; abdomen with four segments in male and three to four segments in female; chelipeds usually robust or elongate. *Miocene (Tortonian–Messinian)–Holocene:* Philippines, *Tortonian–Messinian;* Taiwan, *Miocene–Pliocene;* Indo-West Pacific region, *Holocene.*——Fig. 7,*4a–b*. *P. melita* de Man, 1888, USNM 39655, Holocene, Gulf of Thailand, dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Randallia** Stimpson, 1857, p. 85 [**Ilia ornata* Randall, 1840, p. 129; M, ICZN 1941, Opinion 73; =*R. angelica* Garth, 1940, p. 54, pl. 11,*1–2*]. Carapace circular, seldom rhomboidal; front narrow, usually bilobed; lateral margin smooth or granular; posterolateral margin with two or three tubercles; dorsal surface strongly convex, granular or smooth; regions distinct or indistinct; infraorbital lobe low; anterior margin of pterygostomial region with two rounded lobes; pleonal somites in both sexes incompletely fused; chelipeds massive. *Pliocene–Holocene:* Japan, Taiwan, *Pliocene;* USA (California), Taiwan, *Pleistocene;* Indo-West Pacific region, eastern Pacific and western Atlantic Oceans, *Holocene.*——Fig. 8,*1a–b*. **R. ornata,* USNM 89743, Holocene, California; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Ryphila** Galil, 2009, p. 309 [**Cancer cancellus* Herbst, 1783 in 1782–1804, p. 94, pl. 2,*20;* OD; =*Leucosia scabriuscula* Fabricius, 1798, p. 349]. Carapace discoidal; dorsal surface punctate, variably granulate. Frontal region slightly produced, medially grooved; frontal margin medially denticulate; epistome and lower margin of hepatic facet projecting beyond front; first and second pleonal segments of male narrow, laterally swollen; chelipeds elongate. [Emended from Galil, 2009, p. 310.] *Pliocene–Holocene:* Java, Sumatra, *Pliocene;* eastern Africa, Madagascar, Persian Gulf, Pakistan, India, Mergui Archipelago, Malay Archipelago (Borneo, Sumatra), Myanmar, Thailand, Australia, *Holocene.*——Fig. 8,*2a–b*. **R. cancellus* (Herbst), USNM 205959, Holocene, Pakistan; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Speloeophorus** A. Milne-Edwards, 1865, p. 148 [**Oreophorus nodosus* Bell, 1855, p. 307, pl. 33,*8;* SD Rathbun, 1922, p. 28; ICZN Opinion 73, 1941, ICZN Direction 37, 1956a]. Carapace angular, more or less triangular overall, widest posteriorly; axial and gastric regions elevated, hepatic regions flattened; very large pits in carapace surface anterior to cardiac region and in posterior of branchial regions, larger in males than in females. *Pliocene–Holocene:* Panama, *Pliocene;* Caribbean region, western Atlantic Ocean, *Holocene.*——Fig. 8,*3a–b*. **S. nodosus* (Bell), USNM 82140, Holocene, Florida; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Tokoyo** Galil, 2003a, p. 407 [**Randallia eburnea* Alcock, 1896, p. 197; OD; =*R. japonica* Yokoya, 1933, p. 130, fig. 46; =*T. trilobata* Komatsu, Manuel, & Takeda, 2005, p. 116, fig. 5, 7, 7*a–c,g,* 8C–D]. Carapace circular, regions undefined; front narrow, not projected beyond orbits, broadly bilobed; orbits with at least one fissure; lateral margins convex, with spine at anterolateral corner; posterior margin with three blunt spines. *Miocene–Holocene:* Taiwan, *Miocene–Pleistocene;* Japan, *Pleistocene;* western Pacific Ocean, Australia, *Holocene.*——Fig. 8,*4a–b*. **T. eburnea* (Alcock), KSU D 316, Holocene, Japan; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Uhlias** Stimpson, 1871b, p. 117 [**U. ellipticus*; SD Rathbun, 1937, p. 149]. Carapace wider than long, ovate; entire lateral margins flattened and crispate; gastric and axial regions inflated, remainder of carapace flattened; carapace with scattered, large pits in surface. *Pleistocene–Holocene:* Jamaica, *Pleistocene;* Caribbean region, central Pacific Ocean, *Holocene.*——Fig. 8,*5*. **U. ellipticus,* USNM 68261, Holocene, Galapagos Islands, scale bars, 5 mm (new).

## Subfamily LEUCOSIINAE Samouelle, 1819

[*nom. transl.* Miers, 1886, p. 321, *ex* Leucosiadae Samouelle, 1819, p. 91]

Carapace strongly convex, almost hemispherical, and subcircular or hexagonal, with smooth dorsal surface; front narrow, produced anteriorly; regions not defined; thoracic sinus well developed; epistome reduced; merus of maxilliped 3 less than half length of ischium; chelipeds massive, not slender; merus nodular; palm depressed; fingers without hooked tips; abdomen with

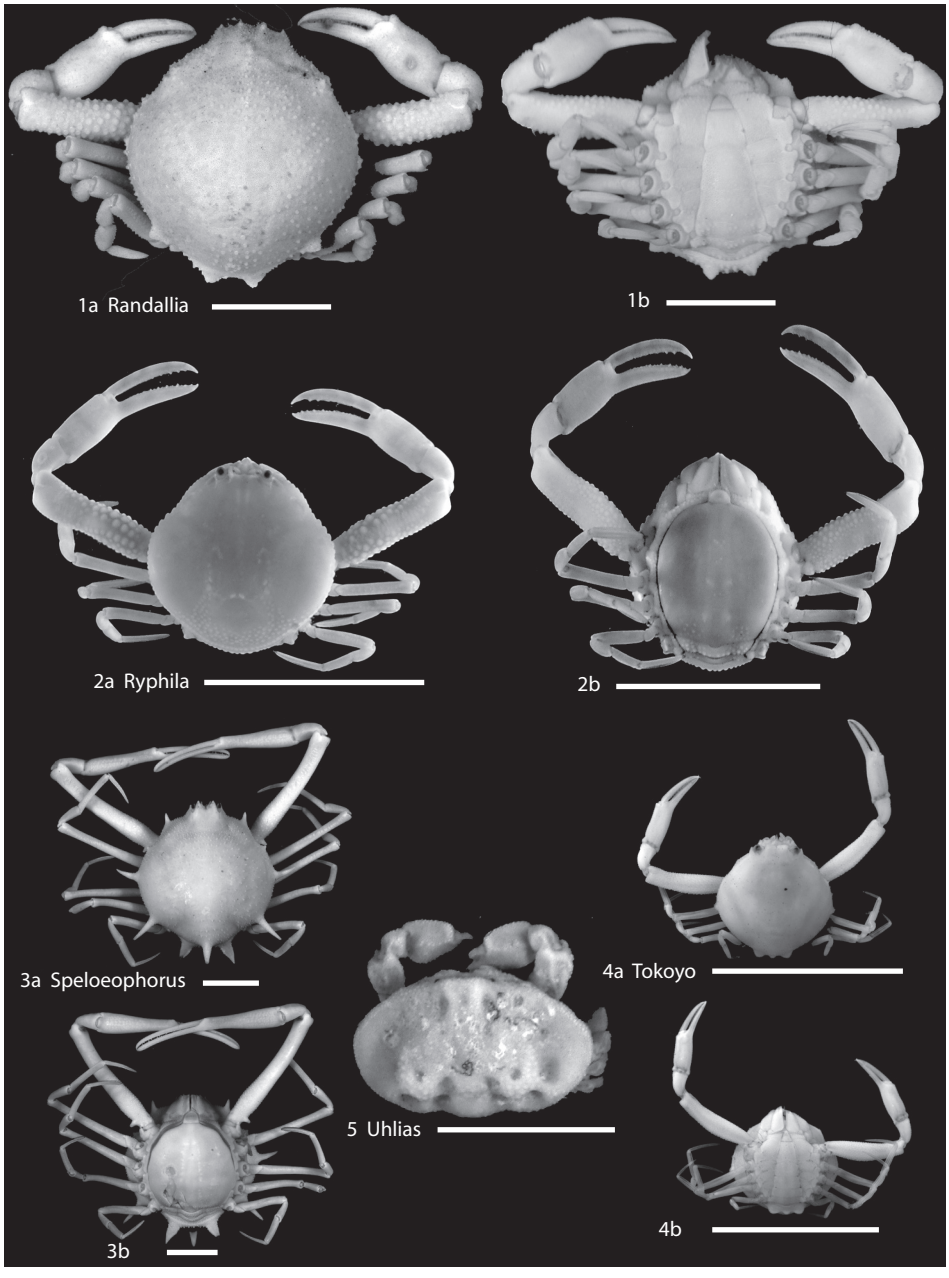


FIG. 8. Family Leucosiidae (p. 10).

somites 3–5 or 2–5 in male and somites 3–6 or 2–6 in female fused. *Miocene–Holocene.*

**Euclosiana** GALIL & NG, 2010, p. 140, *nom. nov. pro Euclosia* GALIL, 2003b, p. 332, *non* MULSANT, VERREAUX, & VERREAUX, 1866, p. 63 (Aves) [**Leucosia obtusifrons* DE HAAN, 1841 in 1833–1850, p. 133, pl. 33,*2;* OD; =*Leucosia mimasensis* SAKAI, 1969, p. 249, fig. 1b]. Thoracic sinus with loop-shaped anterior margin; pleopods 1 of males coiled three times, without apical setae. *Miocene–Holocene:* Java, *Pliocene;* Taiwan, *Pliocene;* Japan, *Pleistocene;* Indo-Pacific region, Australia, *Holocene.*——FIG. 9,*1a–b*. **E. obtusifrons* (DE HAAN), MFM129115,

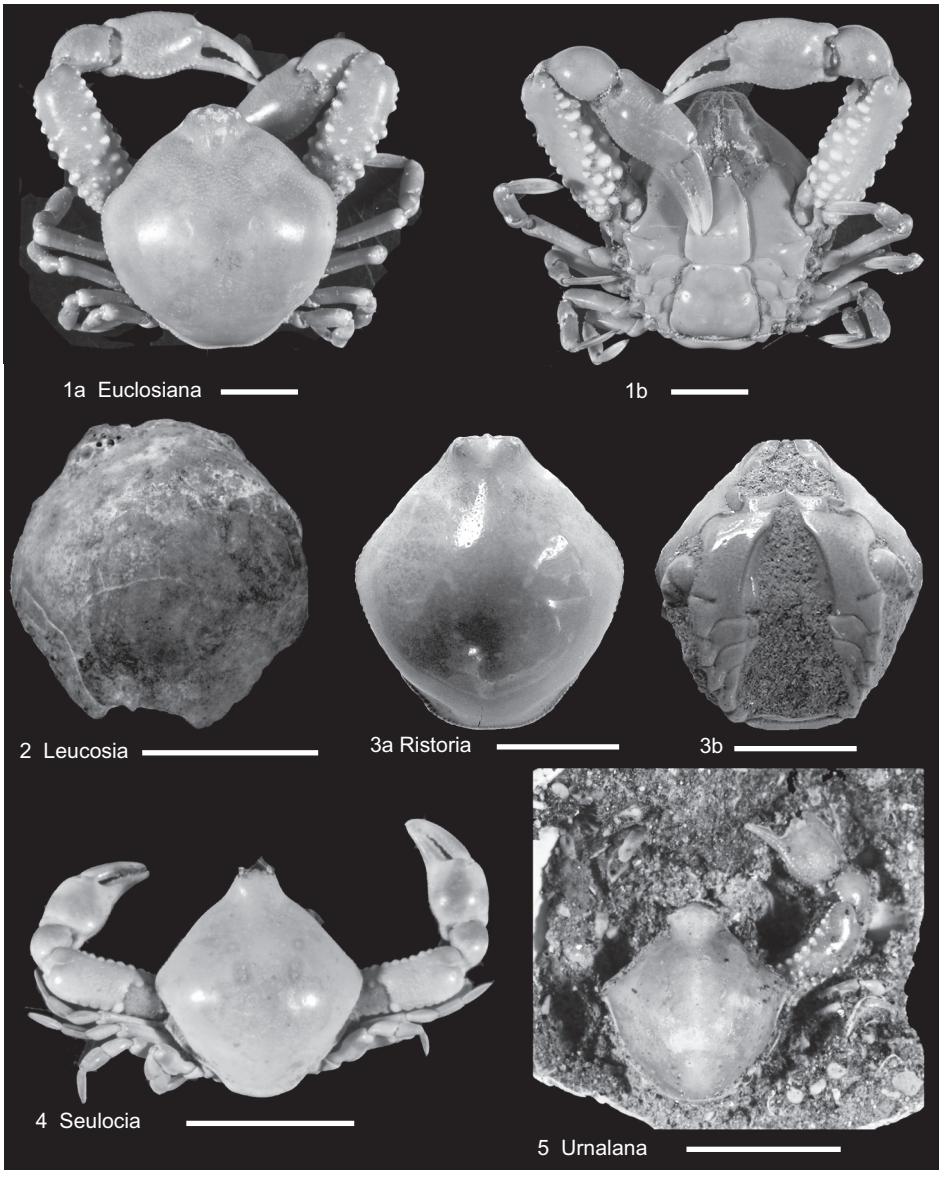


FIG. 9. Family Leucosiidae (p. 11–13).

male, Holocene, Mikawa Bay, Japan; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Leucosia** WEBER, 1795, p. 92 [**Cancer craniolaris* LINNAEUS, 1758, p. 626; SD HOLTHUIS, 1959, ICZN Opinion 712, 1964; =*L. perlata* DE HAAN, 1841 in 1833–1850, p. 134; =*L. pallida* BELL, 1855, p. 285, pl. 30,*2; L. obscura* BELL, 1855, p. 285, pl. 30,*3; L. parvimana* STIMPSON, 1858, p. 57] [=*Leucosides* RATHBUN, 1897, p. 160 (type, *Cancer craniolaris* LINNAEUS, 1758, p. 626; OD)]. Characters of subfamily. *Miocene (Langhian–Serravallian)–Holocene:* Iran, *Langhian–Serravallian;* Java, Malaysia (Sarawak), Taiwan, *Miocene;* Brunei, Java, Taiwan, *Pliocene;* Japan, Java, Philippines, Taiwan, *Pleistocene;* Indo-West Pacific region, Australia, eastern Africa, *Holocene.*——FIG. 9,*2. L. subrhomboidalis* DESMAREST, 1817, Pleistocene, Indo-Pacific region, NHMW 1844 XXXV 12/4, scale bar, 1 cm (new; photo by A. De Angeli, Associ-

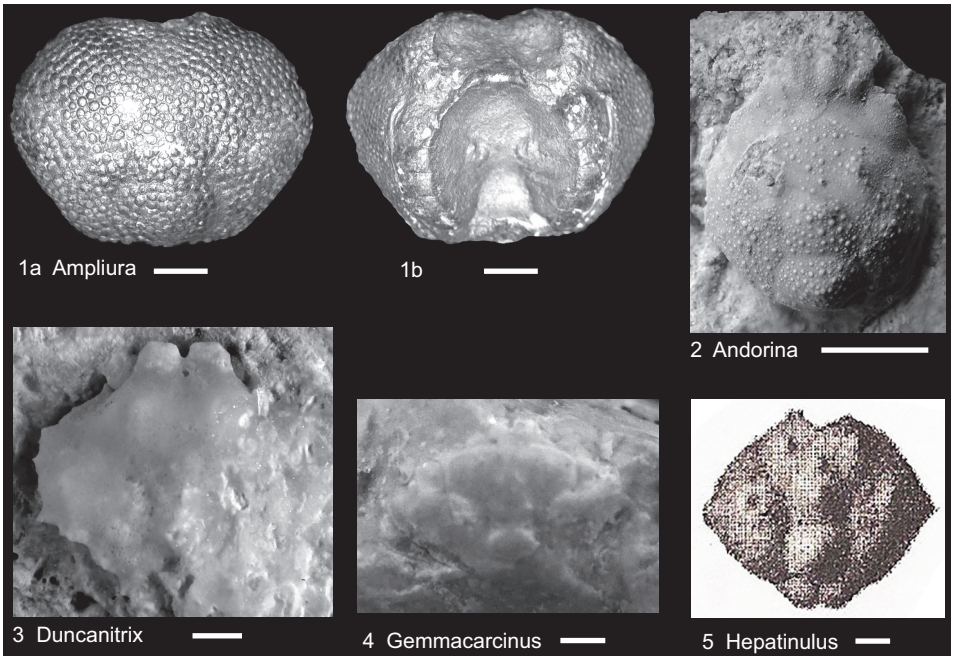


FIG. 10. Family Unassigned (p. 13–14).

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

**Ristoria** GARASSINO, PASINI, DE ANGELI, & CHARBONNIER in GARASSINO & others, 2012, p. 30 [**Ilia pliocaenica* RISTORI, 1891, p. 10, pl. 1,*8–9,11–12* (not fig. 14); M]. Carapace subpentagonal with slightly sinuous lateral angle not overhanging weak thoracic sinus, anteriorly not defined by overhanging margin of pterygostomial region. *Pliocene (Zanclean):* Italy.——FIG. 9,*3a–b*. **R. pliocenica* (RISTORI), GPDG 0200, Italy; dorsal (*a*) and ventral (*b*) views, scale bars, 5 mm (new; photos by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Seulocia** GALIL, 2005b, p. 42 [**Leucosia rhomboidalis* DE HAAN, 1841 in 1833–1850, p. 134, pl. 33,*5;* OD; =*L. maculata* STIMPSON, 1858, p. 57]. Carapace subpentagonal, globose: male abdomen with segments 3–6 fused; pleopod 1 of male with straight shaft, twisted once on its axis. *Miocene–Holocene:* Iran, *Miocene;* Japan, *Pleistocene*; Indo-Pacific region, Japan, Red Sea, Australia, *Holocene.*——FIG. 9,*4*. **S. rhomboidalis* (DE HAAN), MFM129116, female, Holocene, Tosa Bay, Japan, dorsal view, scale bar, 1 cm (new).

**Urnalana** GALIL, 2005a, p. 10 [**Leucosia haematostica* ADAMS & WHITE, 1849, p. 54, pl. 12,*2;* OD]. Carapace hexagonal, frontal area narrow and produced anteriorly in most species, dorsal carapace with setae laterally; male pleopod 1 uncoiled. *Pleistocene–Holocene:* Japan, *Pleistocene;* Indo-Pacific region, Japan, Red Sea, Australia, *Holocene.*——FIG. 9,*5*. **U. haematostica* (ADAMS & WHITE), MFM142511, male, Middle Pleistocene, Japan, scale bar, 1 cm (new).

## UNASSIGNAED GENERA IN THE LEUCOSIOIDEA

**Ampliura** MORRIS & COLLINS, 1991, p. 10, fig. 3 [**A. simplex;* OD]. Carapace small, ovoid, length about three-quarters width, widest at midlength, weakly vaulted transversely, moderately vaulted longitudinally. Front unknown, fronto-orbital width 40 percent maximum carapace width. Orbits with granular rim, upper-orbital biconcave, outer-orbital angle granular. Anterolateral margin convex; posterolateral margin straight; posterior margin straight, about half maximum carapace width. Regions indistinct except cardiac, which is wider than long, ovoid; carapace surface densely covered with closely spaced large granules. Buccal frame rounded, wider than long; sternum apparently very broad, circular, sterno-pleonal cavity deep. *Pliocene,* Brunei.——FIG. 10,*1a–b*. **A. simplex,* holotype (BMNH) In. 62157; *a*, dorsal surface; *b*, ventral surface, scale bars, 1 mm (new).

**Andorina** LŐRENTHEY, 1901, p. 329–330, pl. 1,*1–2* [**A. elegans;* M]. Carapace obovate, longer than wide; frontal and orbital margins with a total of six blunt spines; lateral margins parallel, rounding into convex posterior margin; mesogastric, metagastric,

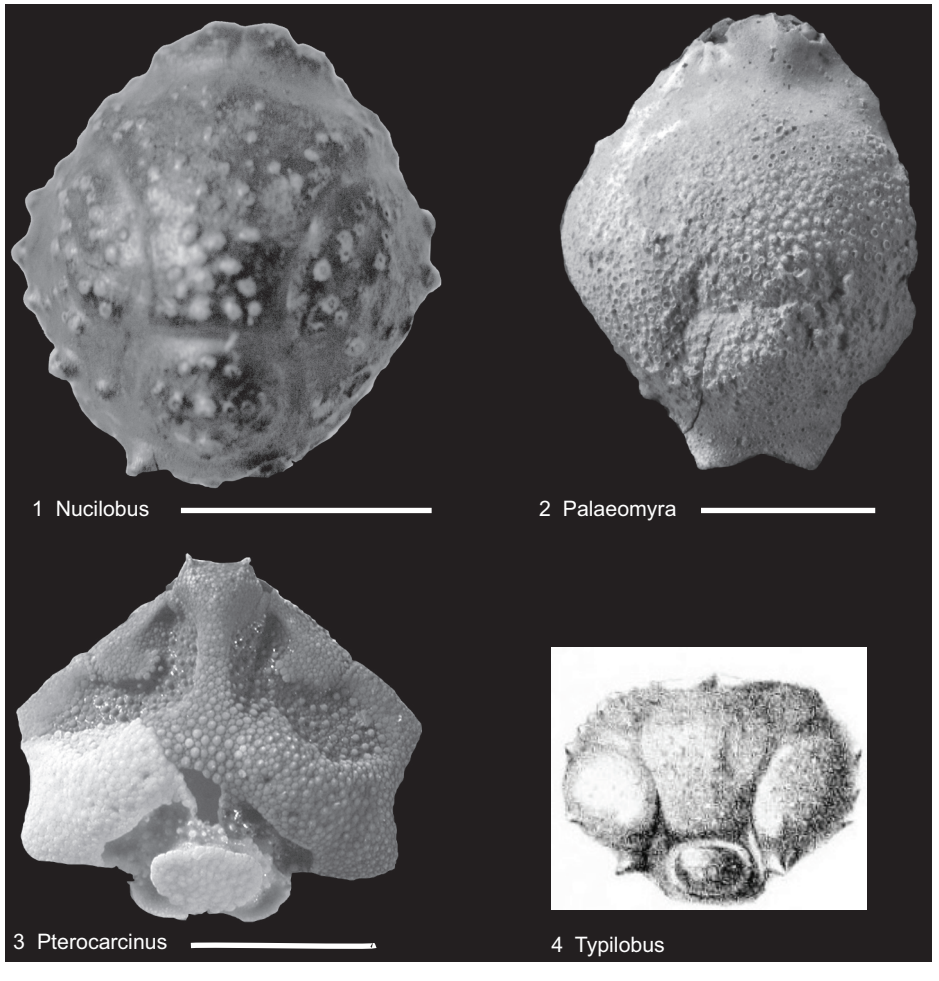


FIG. 11. Family Unassigned (p. 14–15).

and cardiac regions rounded. *Miocene (Langhian):* Hungary.——FIG. 10,*2*. **A. elegans,* holotype, M.30, scale bar, 5 mm (new; photo by M. Hyžný, Comenius University, Bratislava, Slovakia).

**Duncanitrix** SCHWEITZER, DWORSCHAK, & MARTIN, 2011, p. 361, *nom. nov. pro Duncania* PORTELL & COLLINS, 2004, p. 115, *non Duncania* DE KONINCK, 1872, p. 107 (Rugosa); *non Duncania* POURTALÈS in AGASSIZ & POURTALÈS, 1874, p. 44 (Cnidaria); *non Duncania* BAYLE, 1879, p. 35 (Mollusca) [**Duncania jamaicensis* PORTELL & COLLINS, 2004, p. 115, fig. 1,*3;* OD]. Carapace octagonal, about as wide as long; front bilobed; long, concave segment leading to straight segment parallel to axis of animal, straight segment with few spines; posterolateral margin with several, small spines; posterior margin straight; protogastric regions inflated; branchial regions moderately inflated. *Miocene:* Jamaica.——FIG. 10,*3*. **D. jamaicensis* (PORTELL & COLLINS), holotype, UF 103950, scale bar, 1 mm (new; photo by R. Portell, Florida Museum of Natural History, Gainesville, Florida, USA).

**Gemmacarcinus** MÜLLER & COLLINS, 1991, p. 67, pl. 3,*13* [**G. fossatus;* OD]. Carapace ovate; grooves deep. *Eocene (Priabonian)–Miocene (Langhian):* Hungary, *Priabonian;* Spain, *Langhian.*——FIG. 10,*4*. **G. fossatus,* holotype, M.91-145, Priabonian, Hungary, scale bar, 1 mm (new; photo by M. Hyžný, Comenius University, Bratislava, Slovakia).

**Hepatinulus** RISTORI, 1886, p. 121, pl. 3,*6–7* [**H. seguenzai;* M]. Carapace ovate; anterolateral and posterolateral margins well differentiated; posterior margin bilobed; protogastric, mesogastric, cardiac, and epibranchial regions with central tubercle. *Miocene (Burdigalian)–Pliocene:* Italy.——FIG. 10,*5*. **H. seguenzai,* scale bar, 1 mm (digital image of Ristori, 1886, pl. 3,*6*).

**Nucilobus** Morris & Collins, 1991, p. 20, fig. 34 [**N. symmetricus;* OD]. Carapace longer than wide, width about 90 percent length, widest at midlength, strongly vaulted longitudinally and transversely; front narrow, axially sulcate, bilobed, not projected beyond orbits, about 20 percent maximum carapace width. Orbits circular, directed forward; upper-orbital margin rimmed, upturned, with two fissures; fronto-orbital width about 40 percent maximum carapace width. Anterolateral margin short, with a few tubercles, convex; posterolateral margin long, convex, with four prominent spines; posterior margin narrow, sinuous, about 30 percent maximum carapace width, with a thick rim with two spines. Cervical groove convex forward to posterior level of mesogastric region, crossing axis as straight element. Regions anterior to cervical groove undefined. Cardiac region circular, defined by deep grooves, with two large tubercles axially, surrounded by granules. Branchial regions undifferentiated, granular. Sternum circular, sternopleonal cavity depressed, widest at sternite 6. *Eocene (Priabonian)–Pliocene:* Italy, *Priabonian;* Brunei, Malaysia (Sarawak), *Pliocene.*——Fig. 11,*1*. **N. symmetricus,* holotype, (BMNH) In. 61903, Pliocene, Brunei, scale bar, 5 mm (new).

**Palaeomyra** A. Milne-Edwards in Sismonda, 1861, p. 14, pl. 18–20 [**P. bispinosa;* M] [=*Ebalites* Müller, 1978, p. 279 (type, *E. globulosa* Müller, 1975, p. 512, pl. 2,*2–3,5,* OD)]. Carapace ovate, about as wide as long; orbits and frontal area projected beyond remainder of carapace; urogastric and cardiac regions well-defined; anterolateral and posterolateral margins entire; posterior margin with two long spines at corners. *lower Oligocene–Miocene (Serravallian):* Austria, *lower Miocene–Burdigalian;* Hungary, Italy, *Langhian;* Italy, *Serravallian.*——Fig. 11,*2. Palaeomyra globulosa,* KSU 1828, cast of M.86.79, Langhian, Hungary, scale bar, 5 mm (new).

**Pterocarcinus** Blow, 2003, p. 173, fig. 2–4 [**P. baileyi;* OD]. Carapace pentagonal, widest at anterior corner, then maintaining width along more or less parallel lateral margins; fronto-orbital width very narrow; margins sloping posteriorly away from outer-orbital angle to anterior corner, with a notch about halfway in between; lateral margins subparallel; posterior margin broad, straight laterally, with convex projection centrally corresponding to cardiac and intestinal regions; carapace surface covered with tiny, mushroomlike tubercles, especially on pterygostomial region. *Pliocene:* USA (Virginia).——Fig. 11,*3*. **P. baileyi,* paratype, USNM 520708, scale bar, 5 mm (new).

**Typilobus** Stoliczka, 1871, p. 14–15, pl. 3,*3–5* [**T. granulosus;* M] [=*Chumaoia* Hu & Tao, 1996, p. 103, pl. 40,*10* (type, *C. johnfei,* OD)]. Carapace transversely oval, wider than long; front bilobed; lateral margin smooth or granular, sometimes bearing tubercles; posterior margin with tubercle on each side; dorsal surface strongly convex, granular, with more or less defined regions; male abdomen with seven free somites. *Eocene (Ypresian)–Miocene:* Italy, *Ypresian;* France, Spain; UK (England), *Lutetian;* Egypt, Hungary, *Priabonian;* Germany, *Rupelian;* Germany, Turkmenistan, *Oligocene;* Japan, Spain, *Langhian;* Egypt, *Serravallian–Tortonian;* Spain, *Tortonian;* Brazil, Egypt, India, Taiwan, Pakistan, Malaysia (Sabah), *Miocene.*——Fig. 11,*4*. **T. granulosus,* Miocene, Pakistan, ×1.5 (digital image of Stoliczka, 1871, pl. 3,*3*).

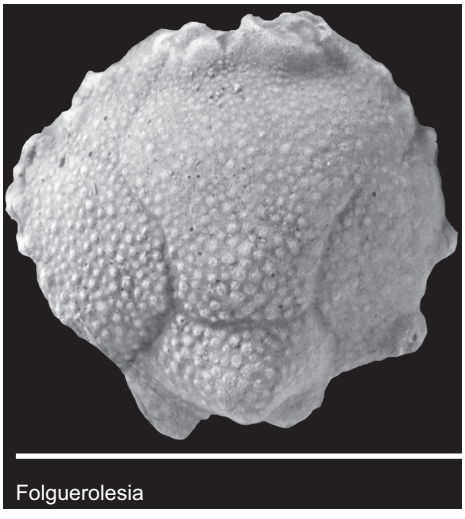


Fig. 12. Family Folguerolesiidae (p. 15).

## Family FOLGUEROLESIIDAE Artal and Hyžný, 2016

[Folguerolesiidae Artal & Hyžný, 2016, p. 392]

Family diagnosis as for genus. *Eocene (Lutetian):* Spain.

**Folguerolesia** Artal & Hyžný, 2016, p. 392 [**Typilobus boscoi* Vía Boada, 1959, p. 40, fig. 10; OD]. Carapace round, about as wide as long, ornamented with coarse granules overall; axial regions well outlined; cardiac region large, strongly inflated; anterolateral margins with 5 or 6 blunt spines; posterolateral margin with strong central spine; posterior margin with two or three blunt spines; rostrum broadly bilobed; sternum broad; female with all pleonites free, male with pleonites 3 and 4 fused. *Eocene (Lutetian):* Spain.——Fig. 12. **F. boscoi* (Vía Boada), KSU D 191, cast of holotype, MGSB 15932, scale bar, 1 cm (new).

## Family MATUTIDAE de Haan, 1841

[*nom. correct.* MacLeay, 1838, p. 70, *pro* Matutoidea de Haan, 1835 in 1833–1850, p. 126]

Carapace not much wider than long, widest at about midlength, regions undifferentiated, ornamented with discrete tubercles not arranged in rows; lateral spine may be present;

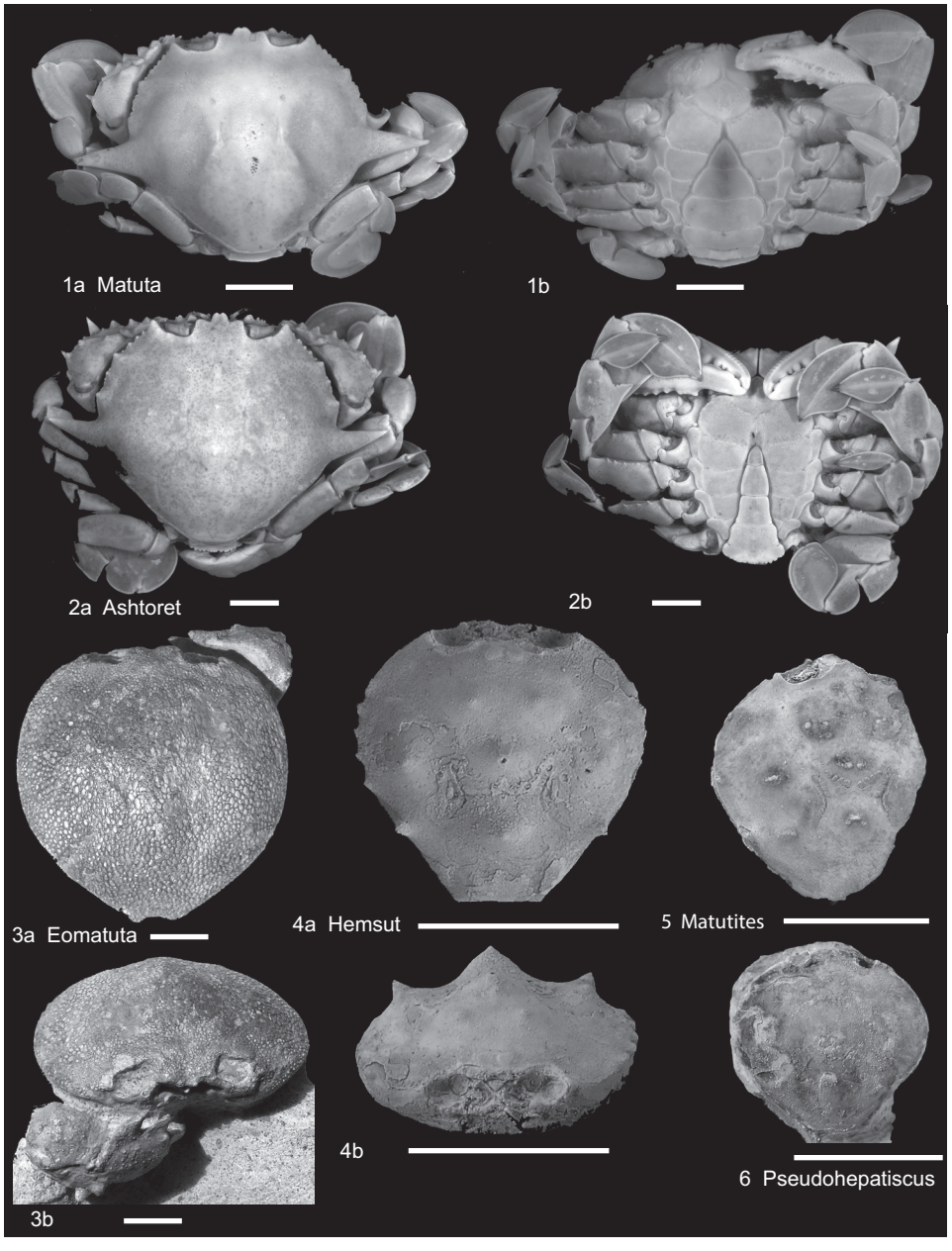


FIG. 13. Family Matutidae (p. 16–17).

anterolateral and posterolateral margins often with discrete spines; front trilobate or with four spines; posterior margin narrow; pereiopods 2–5 paddle-like; chelae with few spines on upper margin and rows of tubercles on outer surface; sternum obovate, narrow, widest anterior to midlength; sterno-pleonal cavity extending onto sternite 4; pleonal somites 3–5 fused in males [BELLWOOD, 1996; SCHWEITZER & FELDMANN, 2000]. *Eocene–Holocene.*

**Matuta** WEBER, 1795, p. 92 [**Cancer victor* FABRICIUS, 1781, p. 502, SD LATREILLE, 1810, p. 422; =*M.*

*peronii* Leach, 1817 in 1814–1817, p. 13, pl. 127,*1–2; M. lesueurii* Leach, 1817 in 1814–1817, p. 14 [=*Matutinus* MacLeay, 1838, p. 70 (type, *Cancer victor* Fabricius, 1781, p. 502, M)]. Carapace ovate, regions broadly defined as inflations, tubercles on protogastric regions; front trilobed; orbits squared; anterolateral margins with multiple small spines and long, sharp spine at anterolateral corner. *Holocene:* Indo-Pacific region, eastern Africa, Red Sea.——Fig. 13,*1a–b.* **M. victor* (Fabricius), USNM 73147; dorsal (*a*) and ventral (*b*) views, Philippines, scale bars, 1 cm (new).

**Ashtoret** Galil & Clark, 1994, p. 4 [**Matuta picta* Hess, 1865, p. 158, pl. 6,*13;* OD; =?*M. doryophora* Latreille, 1825, p. 154; =*M. distinguenda* Hoffmann, 1877, p. 27, pl. 6,*49–52,* pl. 7,*53–55*]. Carapace ovate, about as wide as long, not including long lateral spines, and with tubercles on protogastric, mesogastric, cardiac, and epibranchial regions; front trilobate; orbits deepest axially, more shallow laterally; anterolateral margins with spines or nodes and one long spine at maximum width; posterolateral margins with one small spine or protuberance. *Miocene (Langhian)–Holocene:* Japan, *Langhian*; Indo-Pacific region, *Holocene.*——Fig. 13,*2a–b. A. lunaris* Forskål, 1775, USNM 1441045, Holocene, Philippines; dorsal (*a*) and ventral (*b*) views, scale bars, 1 cm (new).

**Eomatuta** De Angeli & Marchiori, 2009, p. 106–107, fig. 2 [**E. granosa;* OD]. Carapace cordate, regions undefined, covered with large, irregularly shaped tubercles; front quadrilobed; orbits rectangular, with sinuous upper-orbital margin; lateral margins continuous, entire; posterior margin very narrow, with triangular spine at each corner; manus with large triangular spines on upper surface. *Eocene:* Italy.——Fig. 13,*3a–b.* **E. granosa,* MCV 08/01; dorsal (*a*) and anterior (*b*) views, scale bars, 1 cm (new; photos by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

**Hemsut** Feldmann & others, 2011, p. 329 [**Hepatiscus schweinfurthi* Noetling, 1885, p. 488, pl. 4,*1;* OD]. Carapace about as long as wide, maximally wide about 40 percent of the distance posteriorly; front sinuous; fronto-orbital width about half maximum carapace width; anterolateral margin initially straight, then followed by five blunt, small, but well-developed spines, with last spine nearly on posterolateral margin; posterolateral margins long, centrally with one spine that originates on the branchial regions but projects laterally so that it could be considered as a posterolateral spine; protogastric and mesogastric tubercles small; cardiac and epibranchial tubercles large. *Eocene (Lutetian–Priabonian):* Egypt.——Fig. 13,*4a–b.* **H. schweinfurthi* (Noetling), SMNS 67861; *a*, dorsal carapace; *b*, anterior view, scale bars, 1 cm (Feldmann & others, 2011, fig. 3,*1–2*).

**Matutites** Blow & Manning, 1996, p. 12–14, pl. 3,*3* [**M. anthonyae;* OD]. Carapace ovate, wider than long, widest at position of second or third anterolateral spine; regions broadly inflated, with sharp swellings at highest points; orbits circular, directed forward, and front projecting slightly beyond orbits; anterolateral margin with two or three, small, sharp spines; posterolateral margin weakly convex, with one large, sharp spine; posterior margin narrow. *Eocene (Lutetian–Priabonian):* USA (South Carolina), *Lutetian–Bartonian;* USA (North Carolina), *Priabonian;* USA (Alabama, North Carolina, South Carolina), *Eocene.*——Fig. 13,*5.* **M. anthonyae,* holotype, USNM 484554, Lutetian–Bartonian, South Carolina, scale bar, 1 cm (new).

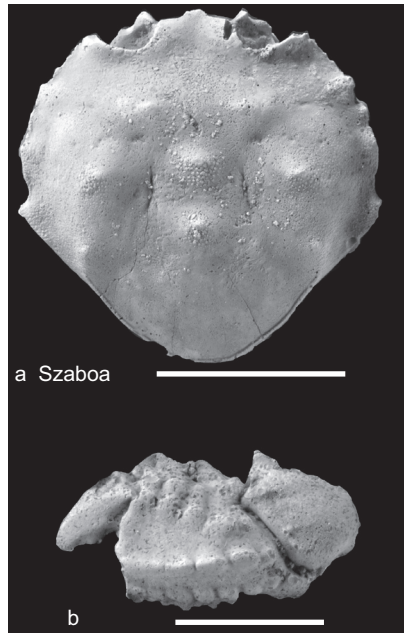


Fig. 14. Family Matutidae (p. 17–18).

**Pseudohepatiscus** Blow & Manning, 1996, p. 14–15, pl. 3,*4* [**P. marinoi;* OD]. Carapace ovate, wider than long, widest at position of second or third anterolateral spine; regions broadly inflated, with weak swellings at highest points; orbits circular, directed forward, and front projecting slightly beyond orbits; anterolateral margin with several, small, sharp spines; posterolateral margin weakly convex; posterior margin narrow. *Eocene (Ypresian–Bartonian):* Italy, *Ypresian–Lutetian;* USA (South Carolina), *Lutetian–Bartonian.*——Fig. 13,*6.* **P. marinoi,* holotype, USNM 484555, Lutetian–Bartonian, South Carolina, scale bar, 1 cm (new).

**Szaboa** Müller & Galil, 1998, p. 583 [**Matuta inermis* Brocchi, 1883, p. 5, pl. 4,*1;* OD]. Carapace about as wide as long, regions poorly defined, with weak tubercles on protogastric, mesogastric, cardiac, and epibranchial regions; front trilobed; anterolateral margins long, with numerous, small spines and one slightly longer, anterolaterally directed spine at corner; posterolateral margin

entire, rimmed, slightly concave; posterior margin weakly convex, rimmed; manus of chelipeds with stout tubercles on outer surface and triangular spines on upper surface, with stridulating ridges on inner surface of spines. *Oligocene (Rupelian)–Miocene (Langhian):* France, *Rupelian;* Germany, *Chattian;* Hungary, *Langhian.*——Fig. 14*a–b*. **S. inermis* (Brocchi), Langhian, Hungary; *a*, dorsal carapace, KSU D 1845 of M.86.390; *b*, KSU D 1659, cast, scale bars, 1 cm (new).

## ABBREVIATIONS FOR MUSEUM REPOSITORIES

**BMNH:** The Natural History Museum, London, England, UK

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

**GPDG:** Palaeontological Collection from the Gruppo Palaeontologica "C. De Giuli," Biblioteca Comunale Vallesiana, Castelfiorentina, Firenze, Italy

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

**M.:** Földtani Intézet, Geological Survey of Hungary, Budapest, Hungary

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

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

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

**MUSNAF:** Museo di Storia Naturale dell'Academia dei Fisiocritici, Siena, Italy

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

**RGM:** Naturalis, Rijks Geologisch-Mineralogisch Museum, Leiden, The Netherlands

**UF:** Florida Museum of Natural History, Invertebrate Paleontology, Gainesville, Florida, USA

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

**ZRC:** Zoological Research Collection of Raffles Museum of Biodiversity Research, Singapore

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