



TREATISE ONLINE

Number 173

Part R, Revised, Volume 1:
Systematic Descriptions: Anomura (Gastrodor-
oidea, Lithodoidea, Lomisoidea, Paguroidea)

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2023

KU PALEONTOLOGICAL
INSTITUTE

The University of Kansas

Lawrence, Kansas, USA
ISSN 2153-4012
paleo.ku.edu/treatiseonline

SYSTEMATIC DESCRIPTIONS: ANOMURA
(GASTRODOROIDEA, LITHODOIDEA, LOMISOIDEA,
PAGUROIDEA)

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Classification of Lithodoidea, Lomisoidea, and Paguroidea follows McLAUGHLIN, LEMAITRE, and SORHANNUS (2007); McLAUGHLIN and others (2010); TUDGE, ASAKURA, and AHYONG (2012); FRAAIJE (2014); and LEMAITRE and McLAUGHLIN (2022). Note that a recent hypothesis suggests that Lithodoidea is nested within Paguridae (NOEVER & GLENNER, 2018). Families are those recognized by DecaNet (accessed through WoRMS, August 2023) as well as several extinct and other monotypic families. Carapace morphology for fossils follows FRAAIJE and others (2019, fig. 1). Some images are used under Non-Commercial 3.0 (CC BY-NC 3, <https://creativecommons.org/licenses/by-nc/3.0/legalcode>).

Superfamily
GASTRODOROIDEA van Bakel,
Fraaije, Jagt, & Artal, 2008

[*nom. transl.* KLOMPMAKER, ARTAL, FRAAIJE, & JAGT, 2011, p. 226, ex *Gastrodorididae* VAN BAKEL, FRAAIJE, JAGT, & ARTAL, 2008, p. 149]

Description as for sole genus. *Middle Jurassic (Bajocian)–Cretaceous (Albian–Cenomanian)*.

Family GASTRODORIDAE van Bakel,
Fraaije, Jagt, & Artal, 2008

[*Gastrodorididae* VAN BAKEL, FRAAIJE, JAGT, & ARTAL, 2008, p. 149]

Description as for sole genus. *Middle Jurassic (Bajocian)–Cretaceous (Albian–Cenomanian)*.

Gastrodorus VON MEYER, 1864, p. 208 [**Prosopon* (*Gastrodorus*) *neubausense*; M] [=*Eopagurus* BEURLEN, 1925, p. 494 (type, *Prosopon* (*Gastrodorus*) *neubausense*, M; =*Eogastrodorus* VAN BAKEL, FRAAIJE, JAGT, & ARTAL, 2008 (type, *Gastrodorus granulatus* FÖRSTER, 1985, p. 54, pl. 1, 4, OD)]. Carapace small, narrowing slightly posteriorly, carapace regions elevated, coarsely granular, defined by deep, smooth grooves; front narrow; long, slender, smooth rostrum; fronto-orbital width approximately 64% maximum width; anterolateral margin weakly convex; posterolateral margin straight; posterior margin strongly concave forward, strongly rimmed; cervical groove deep. *Middle Jurassic–Cretaceous. Middle Jurassic (Bajocian)*: UK (England), France, Switzerland. *Middle Jurassic (Callovian)*: Germany. *Upper Jurassic (Oxfordian–Kimmeridgian)*: Poland. *Upper Jurassic (Tithonian)*: Austria, Czech Republic, Germany. *Cretaceous (Albian–Cenomanian)*: Spain.—FIG. 1, I. **G. Neubausensis* (BEURLEN), NHMW Z1990z0042, Tithonian, Germany, scale bar 1 mm (new).

Superfamily LITHODOIDEA
Samouelle, 1819

[*nom. transl.* McLAUGHLIN, LEMAITRE, & SORHANNUS, 2007, p. 108, ex *Lithodidae* SAMOUELLE, 1819, p. 90]

Carapace well calcified, pleon folded under carapace, carapace regions well defined, commonly spinose; rostrum present; first pereopods chelate, equal or subequal with right larger; second through fourth pereopods walking legs, fifth pereopod subchelate, held under carapace; pleon asymmetrical in females, symmetrical in males, short, wide, well calcified or sac-like and poorly calcified, pleonal terga with supplemental calcified plates lateral to paired plates; first pleonite fused to last thoracic somite; uropods

absent. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 307.] *Miocene–Holocene*.

Family HAPALOGASTRIDAE Brandt, 1850

[*nom. transl.* McLAUGHLIN, LEMAITRE, & SORHANNUS, 2007, p. 111, ex *Hapalogastrica* BRANDT, 1850, p. 268]

Rostrum flat, triangular, usually short; cervical groove absent; pleon with second and last somites poorly calcified; second pleonal somite composed of several plates: one median, two lateral, and two marginal. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 307.] No fossil representatives. *Holocene*.

Hapalogaster BRANDT, 1850, p. 269 [**H. mertensii*; M]. Carapace ovate, wider than long, spinose; sternites 4–7 fused; pleon sac-like, decalcified. [Emended from KEILER, RICHTER, & WIRKNER, 2015, p. 151.] *Holocene*: North Pacific Ocean.—FIG. 1,2. **H. mertensii*, UF 45014, *Holocene*, USA (Washington), scale bar 1 cm (image from STRI Marine portal, invertebase.org/stri, photo by G. Pauly).

Family LITHODIDAE Samouelle, 1819

[*nom. correct. pro.* Lithodiadae SAMOUELLE, 1819, p. 90; ICZN opinion 511, 1958]

Carapace well calcified, pleon folded under carapace, carapace regions well defined, commonly spinose; rostrum present; first pereopods chelate, equal or subequal with right larger; second through fourth pereopods walking legs, fifth pereopod subchelate, held under carapace; pleon asymmetrical in females, symmetrical in males, short, wide, well calcified, pleonal terga with supplemental calcified plates lateral to paired plates; first pleonite fused to last thoracic somite; uropods absent. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 307.] *Miocene (Burdigalian)–Holocene*.

Lithodes LATREILLE, 1806, p. 39 [**Cancer maja* LINNAEUS, 1758, p. 629; M; =*Cancer horridus* PENNANT, 1777; p. 6; =*Cancer spinosus* ASCANIUS, 1777 in 1767–1805, p. 6; =*Lithodes arctica* LATREILLE, 1806, p. 40; =*Lithodes dubius* BRANDT, 1848, p. 172; =*Maia vulgaris* BOSCH, 1801, p. 251] [=*Pseudolithodes* BIRSTEIN & VINOGRADOV, 1972, p. 355 (type, *P. zenkevitchi*, p. 356, fig. 5–6, OD)]. Carapace triangular, not covering bases of walking legs; regions well defined, cervical groove weak; rostrum with median spine that is usually bifid

and one or two pairs of lateral spines, subrostral spine prominent; pleonal somite 2 comprised of three plates or a single plate, somites 3–5 nodose; submedian and marginal pleonal plates well developed; sternite 5 with deep axial groove; pereopod 3 longest, longer than carapace length. [Emended from CHAN, 2010, p. 49.] *Holocene*: Atlantic Ocean and Indo-Pacific Ocean.—FIG. 1,3a. *Lithodes maja* (LINNAEUS), YPM IZ 039302, dorsal carapace, *Holocene*, North Atlantic Ocean, scale bar 5 cm (image from STRI Marine portal, invertebase.org/stri, photo by E. A. Lazo-Wasem).—FIG. 1,3b. **L. santolla* (MOLINA, 1782), USNM 1027851, *Holocene*, Chile, ventral surface, scale bar 1 cm (image from collections.nmnh.si.edu/search/iz/ by A. J. Testa).

Paralithodes BRANDT, 1851, p. 99 [**Lithodes brevipes* H. MILNE-EDWARDS & LUCAS, 1841, p. 463, pl. 24–27; M]. Carapace triangular, pleonal somites 2 with five plates; pleonal somites 3–5 with well-calcified nodules axially, well-defined submedian and marginal plates. [Emended from AHYONG, 2010, p.15; HALL & THATJE, 2018, p. 11.] *Miocene–Holocene. Miocene (Burdigalian)*: Japan. *Holocene*: North Atlantic Ocean, North Pacific Ocean.—FIG. 1,4. *P. camtschaticus* (TILESIUS, 1815), USNM IZ 1517760, *Holocene*, Alaska, USA, scale unknown (photo by Simon Pecnik, Alaska).

Paralomis WHITE, 1856, p. 134 [**Lithodes granulosa* HOMBRON & JACQUINOT, 1846 in 1842–1852, pl. 8,25; M (see HOLTHUIS, 2002, for notes on publication dates); =*Lithodes verrucosa* DANA, 1852c, p. 428] [=*Acantholithus* STIMPSON, 1858, p. 231 (type, *Lithodes hystrix* DE HAAN, 1849 in 1833–1850, p. 218, OD); =*Leptolithodes* BENEDICT, 1895, p. 484 (type, *Paralomis aculeata* HENDERSON, 1888, p. 45, SD); =*Pristopus* BENEDICT, 1895, p. 486 (type, *Pristopus Verrilli*, p. 486, SD)]. Carapace cordate, longer than wide; lateral margins spinose, cervical groove deep, branchiocardiac groove deep around cardiac region; protogastric and mesogastric regions confluent; surface uniformly ornamented with large and small tubercles. *Miocene*: New Zealand. *Holocene*: Atlantic Ocean, Indo-Pacific Ocean.—FIG. 1,5. *P. debodeorum* FELDMANN, 1998, holotype, CM zfc389, *Miocene*, New Zealand, scale bar 1 cm (new).

Superfamily LOMISOIDEA Bouvier, 1895

[*nom. transl.* McLAUGHLIN 1983a, p. 435, as Lomoidea, ex Lomisidae BOUVIER, 1895, p. 206, as Lomisinés]

Diagnosis as for genus. *Holocene*.

Family LOMISIDAE Bouvier, 1895

[*nom. transl.* PILGRIM, 1965, p. 556, ex BOUVIER, 1895, p. 206, as Lomisinés] [=Lomidae, unnecessary correction in GLAESSNER, 1969, p. 481]

Diagnosis as for genus. *Holocene*.

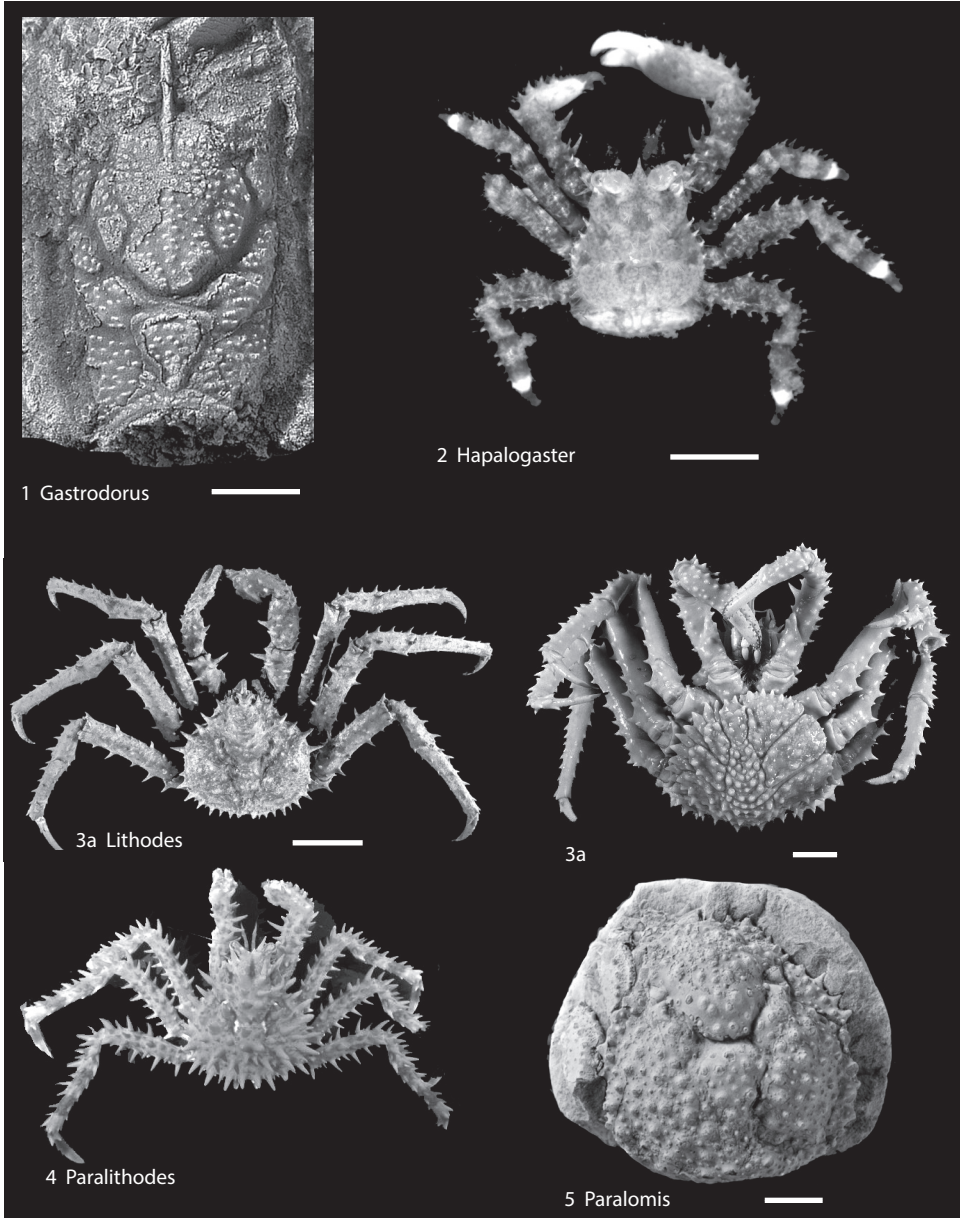


FIG 1. Gastrodoridae, Hapalogastridae, Lithodidae (p. 1–2).

Lomis H. MILNE-EDWARDS, 1837 in 1834–1840, p. 188 [**Porcellana hirta* LAMARCK, 1818, p. 229; M]. Carapace crab-like, symmetrical, flattened, pyriform; ocular scales absent; pereiopod 1 chelate, short, wide, flattened; pereiopods 2–4 short; pereiopod 5 reduced, carried in branchial chamber; pleon held under carapace, first pleonite

visible dorsally; male uropods reduced, telson undivided. [Emended from TUDGE, ASAKURA, & AHYONG, 2012.] *Holocene*: Australia.—FIG. 2, 1. **L. hirta* (LAMARCK), Museum Victoria, Australia, *Holocene*, Australia, scale bar 1 cm (photo from collections.museumsvictoria.com.au/species/8663, photo by M. Marmach).

Superfamily PAGUROIDEA Latreille, 1802

[*nom. corr.* MACDONALD, PIKE, & WILLIAMSON, 1957, p. 210, *pro* Paguridea, BORRADAILE, 1907, p. 468, *ex* Paguriens LATREILLE, 1802 in 1802–1803, p. 29]

Body usually asymmetrical; carapace generally flat, usually calcified anteriorly (shield), posterior carapace usually uncalcified (posterior carapace); shield with rostrum and lateral projections or a post antennal spine; ocular scales well developed or reduced; six antennal articles; first pereopods chelate; second and third pereopods ambulatory, fourth pereopod reduced, chelate or subchelate; fifth pereopod reduced; pleon usually soft, poorly calcified, usually dextrally twisted; uropodal rami not forming tail fan, with rasps, or absent. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 305.] *Lower Jurassic (Pliensbachian)–Holocene.*

Family ANNUNTIDIOGENIDAE Fraaije, 2014

[Annuntidiogenidae FRAAIJE, 2014, p. 123]

Diagnosis as for genus. *Upper Jurassic (Kimmeridgian)–Upper Cretaceous (Maastrichtian).*

Annuntidiogenes FRAAIJE, VAN BAKEL, JAGT, & ARTAL, 2008, p. 195 [**A. ruizdegaonai*, p. 195, fig. 2D, pl. 1,1; OD]. Known only from carapace shield; shield longer than wide, divided into distinct regions by grooves, central gastric groove short, deep; convex postrostral ridge usually present; longitudinally elongated massetic region; medial part of posterior intragastric grooves (=Y-linea of TUDGE, ASAKURA, & AHYONG, 2012) parallel to cervical groove, unconnected medially. [Emended from FRAAIJE & others, 2019, p. 263.] *Upper Jurassic–Upper Cretaceous. Upper Jurassic (Kimmeridgian):* Germany. *Upper Jurassic (Tithonian):* Austria; Czech Republic. *Lower Cretaceous (Berriasian):* Czech Republic. *Lower Cretaceous (Albian–Cenomanian):* Spain. *Upper Cretaceous (Maastrichtian):* The Netherlands.—FIG. 2,2. *A. massetispinosus* FRAAIJE, VAN BAKEL, & JAGT, 2017, holotype, MAB k.3314, Maastrichtian, The Netherlands, scale bar 2.5 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Family COENOBITIDAE Dana, 1851

[*nom. correct.* ORTMANN, 1892, p. 271, *pro* Cenobitidae DANA, 1851, p. 267]

Carapace well calcified; eyestalks flattened; antennae short; first pereopods unequal,

left larger than right, massive; second and third pereopods ambulatory, stout, longer than chelipeds; fourth pereopod chelate or subchelate, fifth pereopod chelate; pleon asymmetrical, may be well calcified, segmentation obscure, may be held under the body; uropods sometimes with rasp. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 305.] *Pliocene–Holocene.*

Coenobita LATREILLE, 1825, p. 277 [**Pagurus clypeatus* FABRICIUS, 1787, p. 328; M]. Cephalothorax widening moderately posteriorly, cervical groove deep, anterior branchial area moderately marked; pleon not well calcified, not held under the body, uropods with rasp; major chela with very large propodus with convex lower margin. *Holocene* (fossils): Antigua, Fiji. *Holocene:* Circumtropical.—FIG. 2,7. **C. clypeata* (FABRICIUS), MNHN-IU-2013-6777, Holocene, Caribbean Sea, scale unknown (photo by L. Corbari & S. Leprieur, MNHN).

Birgus LEACH, 1816 [imprint 1815], p. 337 [**Cancer latro* LINNAEUS, 1767, p. 1049; M; =*Pagurus laticauda* LATREILLE, 1829, p. 75; =*Cancer puru* CURTISS, 1938, p. 169]. Cephalothorax well calcified, widening in posterior half of carapace; cervical groove deep; pleon carried under body, well calcified, uropods without rasp. *Pliocene:* Taiwan. *Holocene:* Indo-Pacific Ocean.—FIG. 2,8. **B. latro* (LINNAEUS), YPM IZ.023314, Holocene, Aldabra Islands, scale unknown (photo by E. A. Lazo-Wasem, peabody.yale.edu).

Family CALCINIDAE Fraaije, van Bakel, & Jagt, 2017

[Calcinidae Fraaije, van Bakel, & Jagt, 2017, p. 3]

Rostrum short, Y-linea distinct; left chela larger than right chela. *Eocene (Ypresian)–Holocene.*

Calcinus DANA, 1851, p. 268 [**Cancer tibicen* HERBST, 1791 in 1782–1804, p. 25; SD DANA, 1852a, p. 122; =*Calcinus formosus* NEUMANN, 1878, p. 31; =*Pagurus sulcatus* H. MILNE-EDWARDS, 1836, p. 279]. Rostrum small; chelipeds very unequal, left much larger, chelae with calcareous black tips of left chelipeds, left carpus with large upper-lateral protuberance; pereopod 4 chelate. [Emended from POORE, 2004, p. 253.] *Eocene:* Italy. *Holocene:* Cosmopolitan.—FIG. 2,3. *C. californiensis* BOUVIER, 1898, MNHN-IU-2008-15689, Holocene, California, USA, scale bar 5 mm (photo by M. Hennion, Project Reolnat, MNHN).

Family DIOGENIDAE Ortmann, 1892

[*nom transl.* McLAUGHLIN, 1983b, p. 616, *ex* Diogeninae ORTMANN, 1892, p. 270] [=Dardantinae SCHMITT, 1926, p.

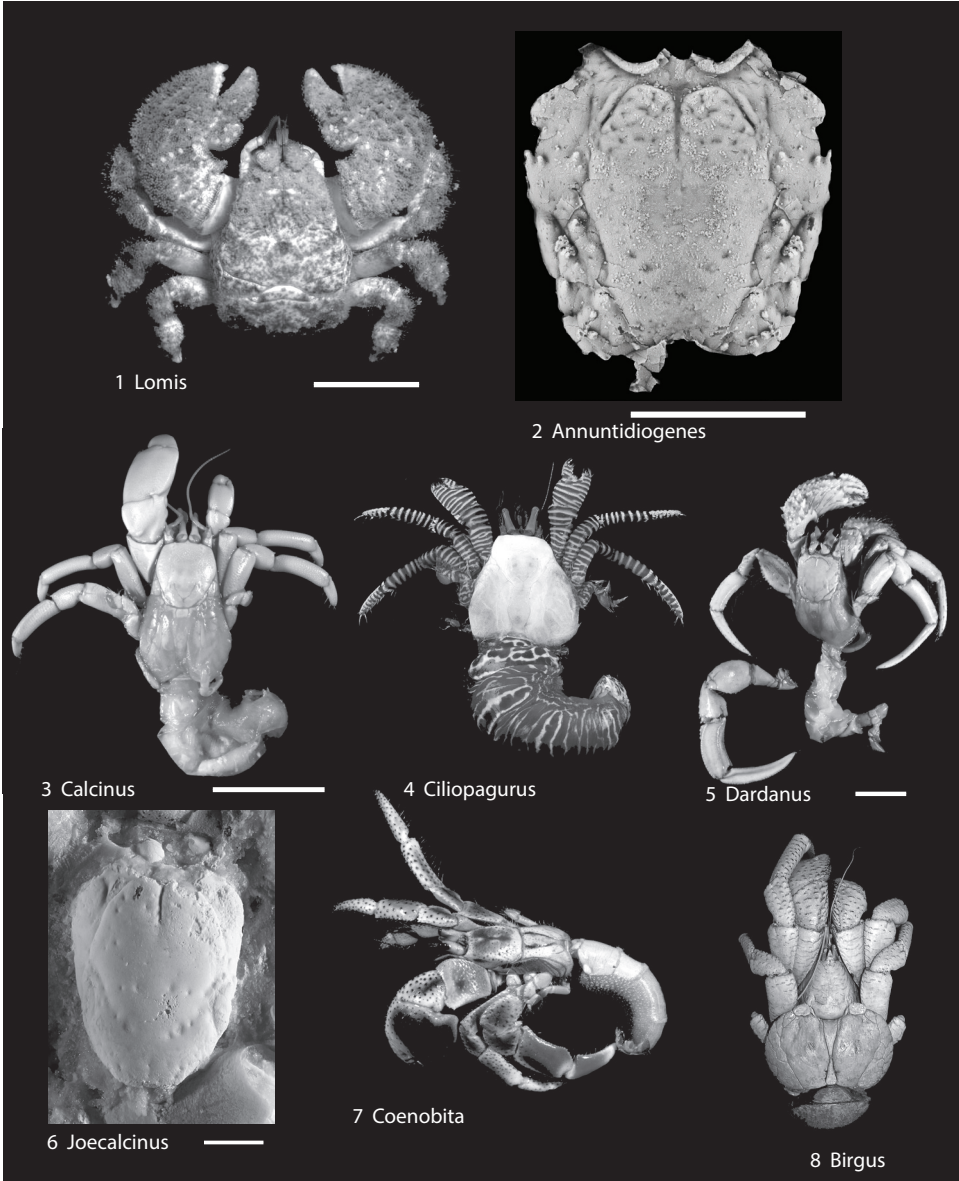


FIG 2. Lomisidae, Annuntidiogenidae, Coenobitidae, Calcinidae, Diogenidae (p. 3–6).

45; =Paguropsidae FRAAIJE, VAN BAKEL, JAGT, CHARBONNIER, SCHWEIGERT, GARCIA, & VALENTIN, 2022, p. 12]

Carapace and pleon paguroid in form; first pereiopods usually unequal, left usually larger, but may be equal or subequal; fifth male pereiopod usually with paired gonopores; pleon well developed, asymmetrical, poorly

calcified, membranous, first pleonal somite distinct from last. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 305.] *Upper Jurassic (Kimmeridgian)–Holocene.*

Diogenes DANA, 1851, p. 269 [**Pagurus miles* FABRICIUS, 1787, p. 327; SD DANA, 1852a, p. 122] [= *Troglopagurus* HENDERSON, 1893, p. 421 (type,

- Troglopagurus manaarensis*, M)]. Rostrum composed of a moveable, hinged plate or reduced, between ocular scales; no trace of cervical groove; chelipeds unequal, claws corneous; pereiopod 4 chelate. [Emended from POORE, 2004, p. 259.] *Eocene–Holocene*. *Eocene* (*Lutetian–Priabonian*): Italy. *Eocene*: Spain. *Eocene*, *Miocene*: Hungary. *Pleistocene–Holocene*: Japan. *Holocene*: Indo-Pacific Ocean, Atlantic Ocean, Australia, Mediterranean Sea.—FIG. 3,1. *Diogenes augustinus* FERRATGES, ZAMORA, & AURELL, 2020, holotype, MPZ2020/54, *Eocene*, Spain, scale bar 1 cm (new; photo by I. Pérez, University of Zaragoza, Spain).
- Bachmayerus** FRAAIJE, VAN BAKEL, JAGT, & SKUPIEN, 2013, p. 253 [**B. cavus*, p. 253, fig. 1E–F; OD]. Shield longer than wide; central gastric groove deep, shallowing posteriorly; massetic groove deep, sinuous; massetic region long, with oblique groove at approximately mid-length; post-frontal ridge weak; shield between massetic grooves with large pits laterally. *Upper Jurassic* (*Tithonian*): Austria, Czech Republic.—FIG. 3,2. *B. matushyzny* FRAAIJE, VAN BAKEL, JAGT, & SKUPIEN, 2013, holotype, NHMW 1990/0041/2785, *Tithonian*, Czech Republic, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).
- Ciliopagurus** FOREST, 1995, p. 43 [**Cancer strigatus* HERBST, 1804 in 1782–1804, p. 25; OD; =*Pagurus annulipes* H. MILNE-EDWARDS, 1848, p. 63]. Carapace triangular, narrowing posteriorly, intragastric groove (Y-linea) well developed; chelipeds equal or left larger, chelae with well-developed transverse ridges with setae extending distally from them; fingers with corneous tips; second and third pereiopod also with transverse ridges. *Eocene–Holocene*. *Eocene* (*Ypresian*): Italy. *Oligocene*: Belgium. *Miocene*: Hungary. *Holocene*: Indo-Pacific Ocean, India, Pacific Ocean, East Africa, West Africa.—FIG. 2,4. **C. strigatus* (HERBST), MNHN-IU-2013-123, *Holocene*, Papua New Guinea, scale unknown (photo by T.-Y. Chan & C. W. Lin, MNHN).
- Clibanarius** DANA, 1852b, p. 6 [**Cancer clibanarius* HERBST, 1791 in 1782–1804, p. 20; OD]. Shield elongate, subrectangular, rostrum short; ocular acicles close together; antennal flagella usually but not always with short setae; chelipeds equal or subequal, with fingers opening horizontally and ending in spoon-shaped, corneous tips. [Emended from NEGRI, LEMAITRE, & MANTELATTO, 2014.] *Eocene* (*Ypresian*): Spain. *Eocene* (*Priabonian*): Italy. *Holocene*: Cosmopolitan (tropical and subtropical).—FIG. 3,3. *C. corallinus* (H. MILNE-EDWARDS, 1848), MNHN-IU-2008-16418, *Holocene*, Indian Ocean, scale bar 1 cm (photo by M. Hennion, Project Recolnat, MNHN).
- Cretacocalcinus** FERRATGES, HYŽNÝ, & ZAMORA, 2021, p. 9 [**C. josaensis*; OD]. Manus higher than long, upper margin convex, lower margin sinuous; fixed finger short, with strong teeth on occlusal surface; movable finger approximately as long as fixed finger; both fingers with large setal pits; outer surface of manus and fingers densely granular. *Lower Cretaceous* (*Aptian*): Spain.—FIG. 3,4. **C. josaensis*, holotype, MPZ2020/430, scale bar, 1 cm (new; photo by I. Perez).
- Dardanus** PAULSON, 1875, p. 90 [**Pagurus depressus* HELLER, 1861, p. 248; OD; =*Cancer lagopodes* FORSKÅL, 1775, p. 93; =*Dardanus helleri* PAULSON, 1875, p. 90, pl. 12, 1]. Carapace elongate-triangular; rostrum absent; shield with well-developed Y-linea and cervical groove; chelipeds well ornamented, with corneous tips on fingers, left generally larger than right. [Emended from POORE, 2004.] *Eocene–Holocene*. *Eocene* (*Ypresian*): Austria, Belgium, Italy, Spain. *Eocene* (*Priabonian*): Italy. *Eocene*: Hungary; Mexico (Baja California Sur, Chiapas). *Miocene*: Dominican Republic, Fiji, Hungary, Japan, Malta. *Pliocene*: Fiji, Italy, Panama. *Pleistocene*: Japan; USA (California). Age unknown: France. *Holocene*: Japan, Atlantic Ocean, Pacific Ocean, Australia.—FIG. 2,5. *D. deformis* (H. MILNE-EDWARDS, 1836), MNHN-IU-2008-14927, *Holocene*, Seychelles Islands, scale bar 2 mm (photo by M. Hennion, Project Recolnat, MNHN).
- Eocalcinus** VIA BOADA, 1959, p. 32 [**E. eocenicus*; OD]. Left chela very high, approximately as high as long; fixed finger very short; movable finger strongly curved, chelae overall circular in shape. *Eocene* (*Ypresian*): Spain. *Eocene* (*Bartonian*): Italy.—FIG. 3,5. **E. eocenicus*, MCZ.4178-I.G.366988, *Eocene*, Spain, scale bar 1 cm (photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).
- Eopaguropsis** VAN BAKEL, FRAAIJE, JAGT, & ARTAL, 2008, p. 144. [**E. loercheri*; OD]. Shield longer than wide, pitted; rostrum not well preserved; orbit rimmed, small post-ocular projection; very deep cervical groove, concave forward; anterior branchial area weakly developed. *Upper Jurassic–Lower Cretaceous*. *Upper Jurassic* (*Oxfordian*): Poland. *Upper Jurassic* (*Oxfordian–Kimmeridgian*): Germany. *Upper Jurassic* (*Tithonian*): Austria, Czech Republic. *Lower Cretaceous* (*Berriasian*): Czech Republic.—FIG. 6,7. *E. schindewolfi* FRAAIJE, ROBINS, VAN BAKEL, JAGT, & BACHMAYER, 2019, holotype, NHMW 1990/0041/3369, *Tithonian*, Austria, scale bar 1 cm (new; photo by B. W. M. Van Bakel, Oertijdmuseum, Boxtel, The Netherlands).
- Joecalcinus** FRAAIJE, BESCHIN, BUSULINI, TESSIER, JAGT, & VAN BAKEL, 2020, p. 102 [**J. bolcensis*; OD]. Shield well calcified, longer than wide, post-frontal ridge and central gastric groove strong; massetic region defined anteriorly; Y-linea developed as a series of pits, scattered pits posterior to Y-linea and just anterior to posterior margin of calcified shield. *Eocene* (*Ypresian*): Italy.—FIG. 2,6. **J. bolcensis*, holotype, Vr 93939, scale bar 1 cm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).
- Longipaguristes** DE ANGELI & CAPORIONDO, 2017, p. 18 [**L. manuelae*; OD]. Outer surface of chelae coarsely granular, inner surface with scabrous ridges; fixed finger with broad, granular medial tooth, curved inward. *Eocene* (*Priabonian*): Italy. *Eocene*: Italy.—FIG. 3,6. **L. manuelae*, holotype

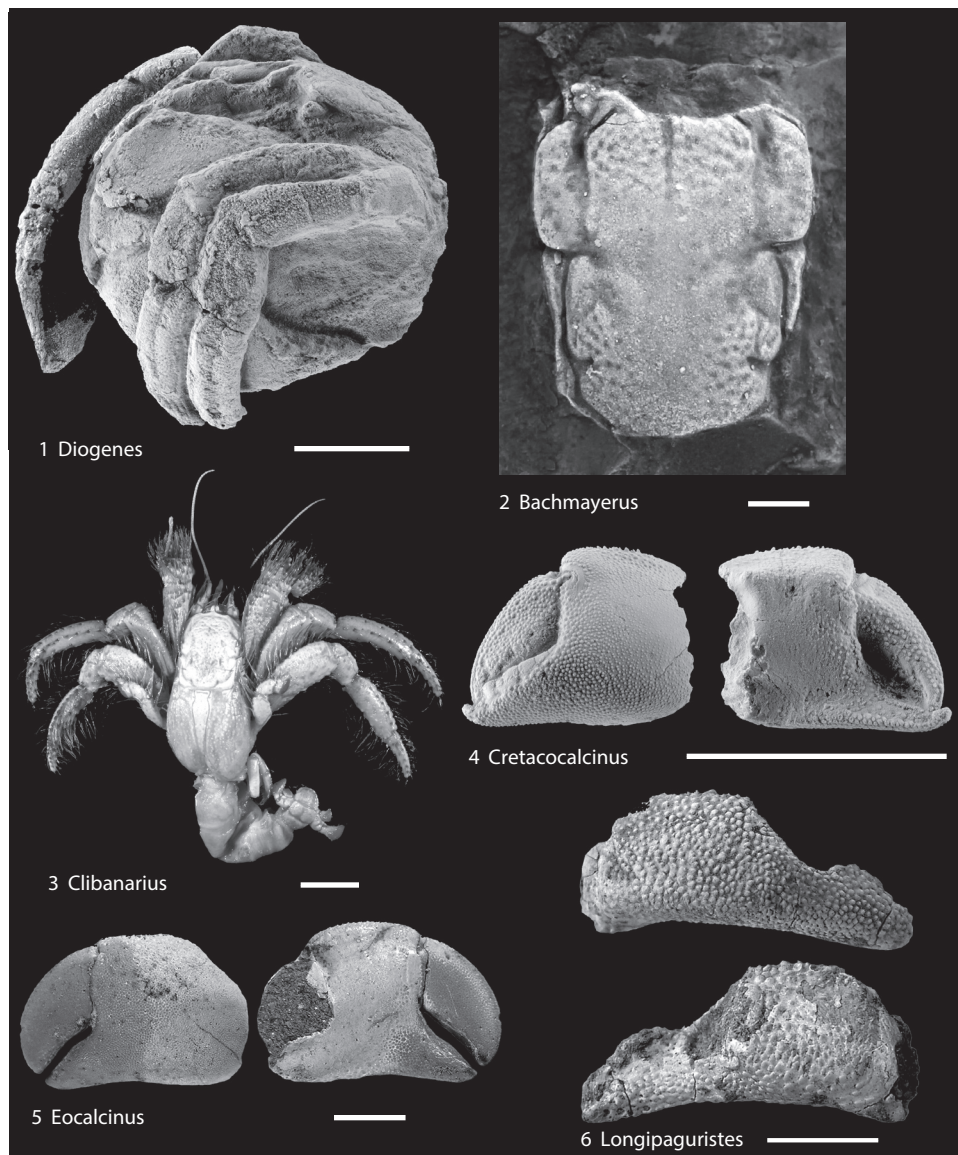


FIG 3. Diogenidae (p. 5–6).

MCZ 4203-I.G.36713, scale bar 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy). *Paguristes* DANA, 1851, p. 269 [*P. hirtus* DANA, 1851, p. 272; SD STIMPSON 1858, p. 73]. Rostrum present; chelipeds equal or unequal; pereopod 4 not chelate, female may have brood pouch for eggs; pleopods 1 and 2 in male modified for copulation; pleopods 1 in female paired. [Emended from POORE, 2004, p. 260.] *Lower Cretaceous–Holocene*. *Lower Cretaceous (Albian)*: Poland. *Upper*

Cretaceous (Turonian): USA (New Mexico). *Upper Cretaceous (Campanian)*: Antarctica (Peninsula). *Upper Cretaceous (Maastrichtian)*: The Netherlands, USA (Mississippi). *Upper Cretaceous*: USA (Arkansas). *Paleocene (Danian)*: Denmark. *Eocene (Ypresian)*: Italy, Spain. *Eocene (Lutetian)*: USA (Washington). *Eocene (Priabonian)*: Italy. *Eocene*: Hungary, Italy, USA (Alabama, California, North Carolina, South Carolina, Washington). *Oligocene (Rupelian)*: Italy. *Oligocene*: Japan. *Miocene (Tortonian)*: Cyprus. *Miocene*: Hungary, USA (Florida).

- Holocene*: Cosmopolitan.—FIG. 4,1. *P. frontalis* (H. MILNE-EDWARDS, 1836), syntype, MNHN IU 2008-14971, Holocene, Australia, scale bar 1 cm (photo by M. Hennion, Project Reolnat, MNHN).
- Paguroopsis** HENDERSON, 1888, p. 98 [**P. typica*, p. 99, pl. X,4; OD]. Carapace shield well calcified, without strong ornamentation, longer than wide and widest anteriorly, calcified median plate adjacent to cervical groove; rostrum strong, triangular; posterior carapace with strong posteromedian plate; chelipeds symmetrical or subequal, with dense setae and small spines or tubercles broadly spaced; pleon generally symmetrical; presence and position of unpaired pleopods in both males and females; subdorsal pereopods 4 and 5, pereopod 4 chelate. [Emended from LEMAITRE, RAHAYU, & KOMAI, 2018, p. 22.] *Holocene*: Indo-West Pacific Ocean.—FIG. 6,6. **P. typica*, Holocene, Philippines, scale bar 1 cm (Henderson, 1888, plate 10,4).
- Palaeopetrochirus** BISHOP, 1991, p. 11 [**P. enigmus*; OD]. Left chela large, overall circular in shape, densely granular, upper margin convex; fingers short, much higher proximally. *Upper Cretaceous (Maastrichtian)*: USA (Mississippi).—FIG. 4,2. **P. enigmus*, holotype GSM 1700, scale bar 1 cm (new).
- Parapetrochirus** FERRATGES, ARTAL, & ZAMORA, 2021, p. 4 [**P. robustus*; OD]. Left chela larger than right chela; left chela with very high fixed finger, with convex lower margin; manus not particularly high, with large, irregularly shaped tubercles on outer margin; upper margin flattened; right chela smaller, fixed finger much less high; ornamented with large, regularly shaped and sized tubercles. *Eocene (Ypresian)*: Spain.—FIG. 4,4. **P. robustus*, MGSB 68569, scale bar 1 cm (new; photo by I. Pérez, University of Zaragoza, Spain).
- Paronapaguroopsis** BESCHIN, BUSULINI, TESSIER, FRAAIJE, & JAGT, 2021, p. 253 [**P. scaligera*; OD]. Shield well calcified; rostrum, triangular; post-frontal ridge arcuate, central gastric groove very shallow; massetic region weakly defined, anterior branchial area ovate; cervical groove apparently deep. *Eocene (Priabonian)*: Italy.—FIG. 4,3. **P. scaligera*, holotype, MSNVR 20.2.288, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).
- Petrochirus** STIMPSON, 1858, p. 71 [**Pagurus granulatus* OLIVIER, 1812 in 1811–1812, p. 640; OD (= *Cancer diogenes* LINNAEUS, 1758, p. 631; = *Cancer bahamensis* HERBST, 1791 in 1782–1804, p. 30)]. Chelipeds subequal, right larger than left, not similar; chelae and other elements ornamented with scabrous tubercles. *Upper Cretaceous–Holocene. Upper Cretaceous (Cenomanian)*: USA (Texas). *Eocene (Ypresian–Lutetian)*: Italy. *Miocene (Tortonian)*: Spain. *Miocene*: Dominican Republic, Hungary, Panama. *Pliocene*: Colombia. *Pleistocene*: Italy, Jamaica, USA (Florida). *Holocene*: Caribbean Sea, Gulf of Mexico, eastern coastal USA.—FIG. 4,5. *P. diogenes* (LINNAEUS), MNHN IU 2013-6765, Holocene, Caribbean Sea, scale unknown (photo by L. Corbari & S. Leprieur, MNHN).
- Striadiogenes** GARASSINO, DE ANGELI, & PASINI, 2009, p. 218 [**S. frigerioi*, p. 219, fig. 2–8; OD]. Shield with cervical and intragastric grooves; chela stout, with transverse terraces; pereopods 2 and 3 very long, stout; dactylus of pereopods 2 and 3 extremely long, lanceolate, curved; elements of appendages with transverse, rugose ridges; pereopods 4 and 5 reduced in size; abdomen uncalcified. *Upper Cretaceous (Cenomanian)*: Lebanon.—FIG. 4,6. **S. frigerioi*, holotype, MSNM i27213, scale bar 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).
- Tetralobistes** AYÓN-PARENTE & HENDRICKX, 2010, p. 50 [**T. bicentenarius*; OD]. Shield well calcified, slightly longer than wide, rostrum short; chelipeds subequal, right generally longer than left, with similar ornamentation consisting of very large tubercles themselves ornamented with smaller tubercles; fingers opening in horizontal plane, tips sharp and corneous. [Emended from AYÓN-PARENTE & HENDRICKX, 2010, p. 50.] *Miocene*: Hungary, Malta. *Holocene*: Mexico, Peru.—FIG. 4,7. *T. weddelli* (H. MILNE-EDWARDS, 1848), MNHN-IU-2008-15013, Holocene, Peru, scale bar 1 cm (photo by M. van Weddingen, MNHN).
- Tithopaguristes** FRAAIJE, ROBINS, VAN BAKEL, JAGT, & BACHMAYER, 2019, p. 269 [**T. porosus*, p. 271, fig. 3A–C; OD]. Shield wider than long, with large pores; central gastric groove strong; post-frontal ridge strong; massetic region large, elongate-ovate; anterior branchial area elongate, oblique; cervical groove deep where known. *Upper Jurassic (Tithonian)*: Austria.—FIG. 4,8. **T. porosus*, holotype, NHMW 1990/0041/3178, scale bar 1 cm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).
- Ululapagurus** FRAAIJE, 2014, p. 124 [**U. vanbakeli*; OD]. Shield approximately as wide as long; post-frontal ridge sinuose; central gastric groove short, elements diverging posteriorly; massetic region flattened, rectangular; anterior branchial area elongate-ovate, narrowed anteriorly; cervical groove deep, deepest laterally; shield centrally with pores. *Upper Jurassic (Kimmeridgian)*: Germany. *Upper Jurassic (Tithonian)*: Austria.—FIG. 4,9. **U. vanbakeli*, holotype, NHMW 1990/0041/3480, Tithonian, Austria, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Family PAGURIDAE Latreille, 1802

[*nom. correct.* SAMOUELLE, 1819, p. 91, *pro* Pagurigenae
LATREILLE, 1802 in 1802–1803, p. 29]

Carapace narrow, posteriorly soft and membranous; chelipeds unequal or subequal with right chelipeds larger; second and third pereopods long and slender; fourth and fifth pereopods reduced, one or both chelate or

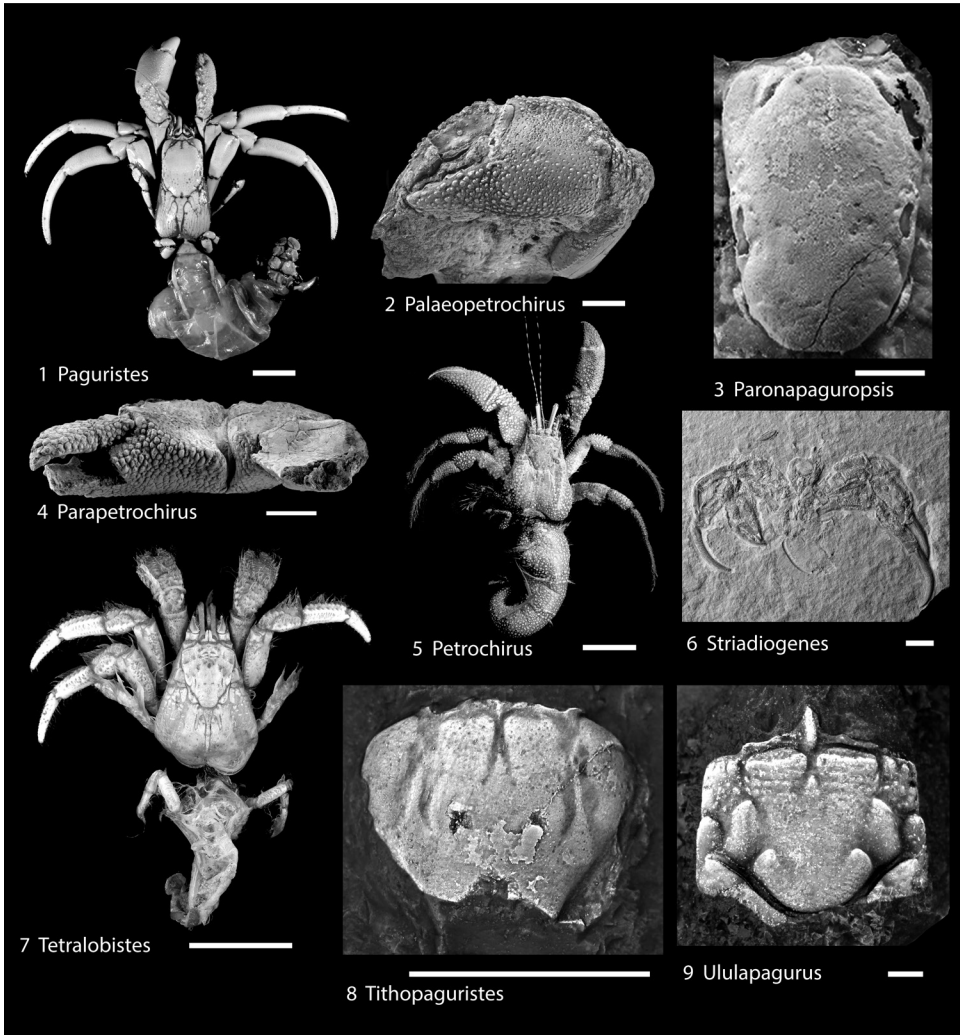


FIG 4. Diogenidae (p. 7–8).

subchelate; male fifth pereiopod with paired gonopores; males with pleopods absent or with three or four left pleopods; females with three to five left pleopods; pleon soft, well developed, usually asymmetrical, membranous; uropods usually symmetrical, modified to hold shell; telson usually with median constriction. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 306.]

Pagurus FABRICIUS, 1775, p. 410 [**Cancer bernhardus* LINNAEUS, 1758, p. 631; SD LATREILLE, 1810, p. 422] [=*Bernhardus* DANA, 1851, p. 269 (type,

C. bernhardus, OD); =*Eupagurus* BRANDT, 1851, rejected under ICZN Opinion 472, 1957 (type, *C. bernhardus*, OD); =*Nympagurus* BOONE, 1932, p. 16 (type, *N. galapagensis*, p. 17, OD)]. Carapace shield well calcified, carapace posterior to shield membranous; chelipeds very unequal, right always larger; pereiopod 4 with spines on propodus; male with three or four unpaired pleopods; female with four unpaired pleopods; uropods asymmetrical. *Lower Cretaceous–Holocene*. *Lower Cretaceous (Aptian)*: Spain. *Lower Cretaceous (Albian)*: USA (Texas). *Upper Cretaceous (Campanian)*: USA (Alabama, Mississippi). *Paleocene*: USA (Alabama). *Eocene (Lutetian)*: Italy, Spain. *Eocene (Bartonian)*: Spain. *Eocene*: Denmark, Egypt, Hungary, Italy.

- Oligocene (Chattian)*: Germany. *Oligocene*: USA (Washington). *Miocene (Burdigalian)*: France. *Miocene*: Austria, Hungary, Italy, The Netherlands, New Zealand. *Pliocene*: Italy, UK (England). *Pleistocene*: Japan, USA (Washington). *Holocene*: Cosmopolitan.—FIG. 5,1. *P. triangularis* (CHEVREUX & BOUVIER, 1892), holotype MNHN-IU-2008-15161, Holocene, West Africa, scale bar 1 mm (photo by M. Van Weddingen, MNHN).
- Anapagurus** HENDERSON, 1886, p. 337 [**Pagurus laevis* BELL, 1846 in 1844–1853, p. 184; SD HOLTHUIS, 1962, p. 242]. Carapace shield calcified, anterior margin rounded, lateral projections with submarginal spine; rostrum short, rounded; chelipeds very unequal; pereopod 4 subchelate; telson with transverse suture, posterior lobes asymmetrical, lateral margins entire or with spinules. [Emended from GARCÍA-GÓMEZ, 1994, p. 8.] *Eocene–Holocene*. *Eocene (Ypresian, Priabonian)*: Italy. *Miocene*: Hungary. *Pleistocene*: Italy. *Holocene*: eastern Atlantic Ocean, Indian Ocean, Japan.—FIG. 5,2. **A. laevis* (BELL), scale bar 1 mm (photo by J. Lecomte, CNRS, from INPN, with permission of P. Noel).
- Anisopagurus** McLAUGHLIN, 1981, p. 6 [**Eupagurus bartletti* A. MILNE EDWARDS, 1880, p. 41; OD]. Shield subovate, narrowing posteriorly, approximately as long as wide; right cheliped with subopercular shape, very rounded convex, lower margin of chela; articulation of propodus and carpus nearly perpendicular; left cheliped with convex lower margin, with articulation of propodus and carpus perpendicular to approximately 45°; both chelae heavily ornamented. [Emended from LEMAITRE & McLAUGHLIN, 1996, p. 90.] *Eocene–Holocene*. *Eocene (Ypresian)*: Spain. *Miocene*: Hungary. *Holocene*: Southeastern USA, Gulf of Mexico, Caribbean Sea, Brazil.—FIG. 5,3. *A. pygmaeus* (BOUVIER, 1918), scale bar 1 cm (Bouvier, 1918, fig. 4.2–3).
- Capsulapagurus** FRAAIJE, VAN BAKEL, ISEBYT & JAGT, 2011, p. 249 [*C. christiaensi*; OD]. Right cheliped with oval transverse cross section of propodus; outer surface covered with tubercles and setal pits; largest tubercles on dorsal side of carpus, propodus and dactylus; some tubercles on outer side of carpus and/or propodus with anteriorly directed, circular depressions bearing multiple setal pits, characteristic of capsulated setae; fingers moderately curved inwards. [Emended from FRAAIJE & others, 2011, p. 249.] *Lower Cretaceous (Albian)*: France.—FIG. 5,4. **C. christiaensi*, MAB k.3158, scale bar 1 cm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).
- Diacanthurus** McLAUGHLIN & FOREST, 1997, p. 237 [**Eupagurus spinulimanus* MIERS, 1876, p. 63, pl. 1,6; OD; =*Aniculus chiltoni* THOMPSON, 1930, p. 265, pl. 41; =*Eupagurus edwardsii* FILHOL, 1884, p. 66; =*Eupagurus intermedius* LENZ, 1901, p. 446, fig. 8–10; =*Eupagurus norae* CHILTON, 1911, p. 299]. Carapace shield triangular, rostrum reduced or broad; chelae of pereopod 1 broadly rounded, left cheliped rotated clockwise at propodus–carpus articulation; pereopod 4 pseudochele; uropods asymmetrical; telson with notch on lateral margins, with broad posterior–median notch, inner margins of notch each with a strong spine. [Emended from McLAUGHLIN & FOREST, 1997, p. 237.] *Miocene (Burdigalian)*: New Zealand. *Holocene*: Western Pacific Rim.—FIG. 5,5. *D. ophthalmicus* (ORTMANN, 1892), CBM-ZC 1099, Holocene, Japan, scale bar 1 cm (new; photo by H. Kato, Natural History Museum and Institute, Chiba, Japan).
- Goniochirus** ÉTALLON, 1861, p. 145 [**G. babeaui*, p. 146, pl. 2,7; SD GLAESSNER, 1929, p. 200]. Manus of chela approximately as long as high, lower margin strongly convex; fixed finger stout at base; wide gap between fixed and movable fingers. *Lower Jurassic–Upper Jurassic*. *Lower Jurassic (Toarcian)*: France. *Middle Jurassic (Bajocian)*: France, Spain. *Middle Jurassic (Bathonian)*: Spain. *Middle Jurassic* (undifferentiated): UK. *Upper Jurassic (Oxfordian)*: Spain, Switzerland.—FIG. 5,6. *G. cristatus* (CARTER, 1886), SM J 25007-14, Callovian–Oxfordian, England, UK, scale bar 1 cm (image from BGS, <http://www.3d-fossils.ac.uk/fossilType.cfm?typSampleId=20006827>).
- Orbispagurus** DE ANGELI & CAPORIONDO, 2017, p. 22 [**O. tessellatus*; OD]. Right chela overall round, upper and lower margins strongly convex; outer surface of manus and fingers ornamented with dense, closely spaced tile-like structures; fixed finger short, with central blunt tooth; distal margin strongly projected into a finger-like structure at articulation with movable finger. *Eocene*: Italy.—FIG. 5,7. **O. tessellatus*, holotype, MCZ.4198-I.G. 36708, scale bar 1 mm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).
- Orhomalus** ÉTALLON, 1861, p. 141 [**O. virgulinus*, p. 142, pl. 2,1; SD GLAESSNER, 1929, p. 281]. Chelae nearly isochelous; propodus with convex outer, upper, and lower surfaces; manus higher than long; manus and carpus articulation rotated to inner surfaces; fixed finger short, with tiny spines on occlusal surface. *Lower Jurassic–Lower Cretaceous*. *Lower Jurassic (Pliensbachian)*: France. *Lower Jurassic (Toarcian)*: Germany. *Middle Jurassic (Bathonian)*: France. *Middle Jurassic (Callovian)*: France, Romania. *Upper Jurassic (Oxfordian)*: France, Germany, Switzerland. *Upper Jurassic (Tithonian)*: Italy. *Lower Cretaceous (Berriasian–Hauterivian)*: France.—FIG. 6,1. *O. spinosus* SCHWEITZER, FELDMANN, & LAZÁR, 2009, paratype, LPBIIIaart177, Callovian, Romania, scale bar 1 cm (new).
- Palaeopagurus** VAN STRAELEN, 1925, p. 312 [**P. deslongchampsii*, p. 313; SD GLAESSNER, 1929, p. 297]. Manus of chela rectangular, convex outer surface, flattened inner surface, upper and lower margins weakly convex or straight; fixed finger short, quite high proximally; upper surface of manus usually serrate. *Lower Jurassic–Upper Cretaceous*. *Lower Jurassic (Pliensbachian–Toarcian)*: France. *Middle Jurassic (Bajocian–Callovian)*: France. *Upper Jurassic (Oxfordian)*: France; UK (England). *Upper Jurassic (Kimmeridgian)*:

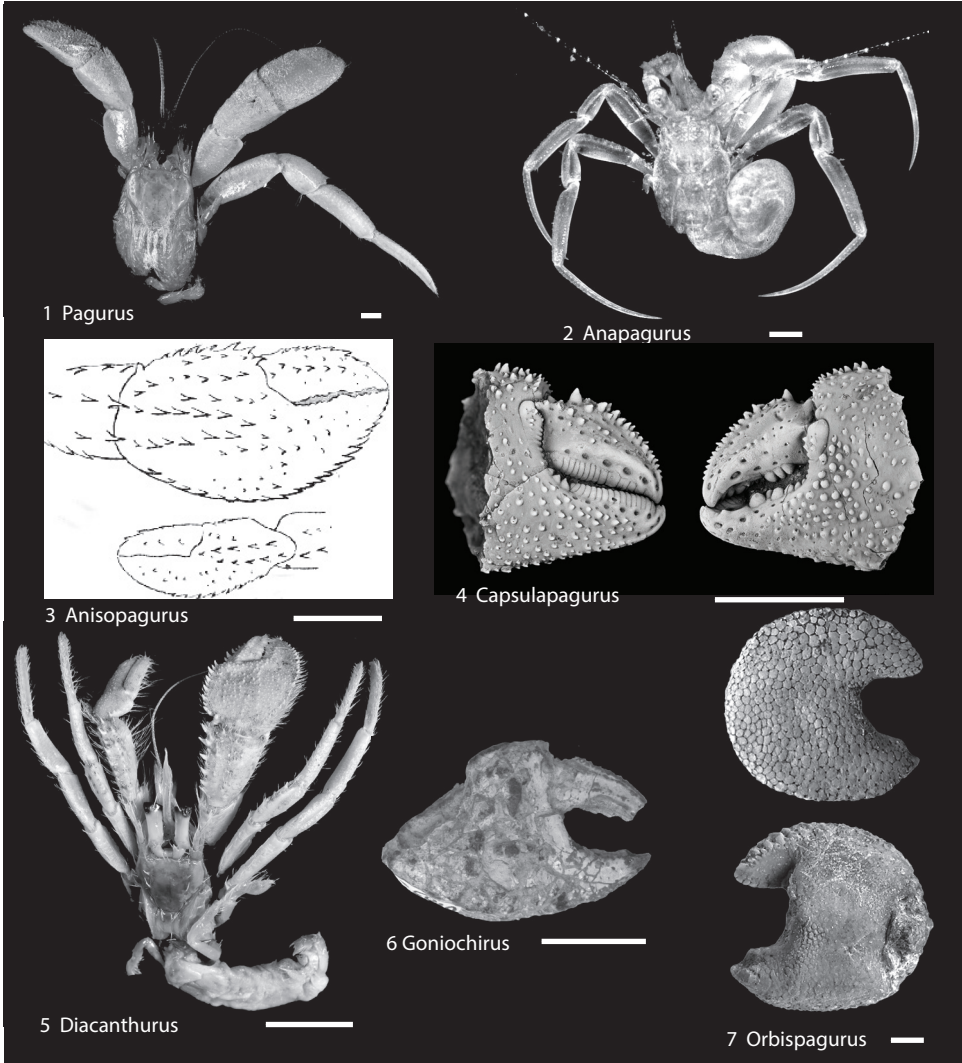


FIG 5. Paguridae (p. 9–10).

Switzerland. *Upper Jurassic (Tithonian)*: France. *Lower Cretaceous (Hauterivian)*: UK (England). *Upper Cretaceous (Coniacian–Santonian)*: Germany. *Upper Cretaceous (Campanian)*: USA (Delaware, New Jersey).—FIG. 6,3. *P. jurensis* (ÉTALLON, 1861), MNHN.FA29724, inner and outer views of manus, Kimmeridgian, France, scale bar 1 cm (photo by J. Falconnet, Project Reclonat, MNHN). **Paracapsulapagurus** HYŽNÝ, FRAAIJE, MARTIN, PERRIER, & SARR, 2016, p. 1133 [**P. poponguinensis*; OD]. Right chela well preserved; merus and carpus short, carpus with strong spines on upper margin; manus approximately as long as high, outer surface densely granular; lower surface concave at articulation with fixed finger; fixed finger high

proximally, with outer keel; capsulated setal pits arranged in arc. [Emended from HYŽNÝ & others, 2016, p. 1134.] *Upper Cretaceous (Campanian–Maastrichtian)*: Senegal.—FIG. 6,4. **P. poponguinensis*, holotype, SENCN-054, scale bar 1 cm (new; photo by M. Hyžný, Comenius University, Bratislava, Slovakia).

Protopagurus FRAAIJE, ROBINS, VAN BAKEL, JAGT, & BACHMAYER, 2019, p. 275 [**P. janoscheki*; OD]. Shield longer than wide; rostrum short, blunt, frontal margin sinuous; submassetic groove deep, post-frontal ridge absent; cervical groove deep, extending laterally to parallel shield margins, with two short grooves extending from it anteriorly; massetic region long, wide; anterior branchial

region sinuous, narrow. *Upper Jurassic (Tithonian)*: Austria, Czech Republic. *Lower Cretaceous (Berriasian)*: Czech Republic.—FIG. 6,5. **P. janoscheki*, holotype NHMW 1990/0041/3481, Tithonian, Austria, scale bar 5 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Pylopagurus A. MILNE EDWARDS & BOUVIER, 1893, p. 74 [**Eupagurus discoidalis* A. MILNE EDWARDS, 1880, p. 41; SD MIYAKE, 1978, p. 119]. Rostrum sharp, frontal margin with anterior projections; chelipeds markedly heterochelous, right chela subcircular or subrectangular, left chela smaller, dorsoventrally compressed; fourth pereopod subchelate, with propodal rasp; pleon usually straight; uropods symmetrical; telson with lateral indentations, posterior margin with two or more small spines. [Emended from McLAUGHLIN & LEMAITRE, 2001a, p. 445.] *Miocene*: Hungary. *Holocene*: Atlantic Ocean, Caribbean Sea.—FIG. 6,10. **P. discoidalis* (A. MILNE EDWARDS), MNHN-IU-2013-19026, Holocene, Caribbean Sea (photo by J. Poupin, used with permission).

Family PARAPAGURIDAE Smith, 1882

[Parapaguridae SMITH, 1882, p. 20]

Carapace and body paguroid; shield wide, rounded, not narrowing posteriorly, sometimes weakly calcified; first pereopods strongly heterochelous, right larger and typically operculate; second and third pereopods simple; fourth pereopod subchelate; fifth pereopod chelate; pleon asymmetrical, tergites entire, telson entire, without transverse suture. [Emended from TUDGE, ASAKURA, & AHYONG, 2012, p. 306.] *Holocene*.

Parapagurus SMITH, 1879, p. 50 [**P. pilosimanus*; M; =*Eupagurus jacobii* A. MILNE EDWARDS, 1880, p. 42; =*Sympagurus grimaldi* A. MILNE EDWARDS & BOUVIER, 1897, p. 134]. Shield well calcified, lateral projections and ventrolateral margins of shield unarmed; right cheliped elongate, propodus rounded; left cheliped well calcified; other pereopods long; second pleon somites with left pleuron terminating ventrally in subtriangular lobe. [Emended from LEMAITRE, 1989, p. 11.] *Holocene*: Atlantic Ocean.—FIG. 6,8. *P. foraminosus* LEMAITRE, 1999, MNHN-IU-2008-15562, Holocene, Baja California, Mexico, scale bar 1 cm (photo by A. Lardeur, MNHN).

Family PILGRIMCHELIDAE Fraaije, 2014

[Pilgrimchelidae FRAAIJE, 2014, p. 128]

Shield well calcified, length equal to or slightly higher than width; large massetic

and keraial regions, small anterior branchial area; rostrum and post-ocular spines distinct, triangular; anterior portion of gastric region delimited by slightly convex post-frontal ridge, with central gastric groove; keraial region reniform anteriorly at widest part of cervical groove, laterally bordered by anterior branchial area. [Emended from FRAAIJE, 2014, p.128.] *Upper Jurassic (Oxfordian)*–*Lower Cretaceous (Albian)*.

Pilgrimcheles FRAAIJE, KRZEMIŃSKI, VAN BAKEL, KRZEMIŃSKA, & JAGT, 2014, p. 685 [**P. karolinae*; OD]. Shield well calcified, length approximately equal to width; rostrum broadly triangular; post-ocular spines short, triangular; post-frontal ridge moderately developed; central gastric groove short; massetic region longer than wide, submassetic region narrow, much longer than wide; keraial region elongate, well dilineated, anterior branchial area smaller than keraial region; keraial groove long, directed axially; cervical groove deep, not appearing to intersect lateral margins. *Upper Jurassic (Oxfordian)*: Poland. *Upper Jurassic (Kimmeridgian)*: Germany. *Upper Jurassic (Tithonian)*: Austria.—FIG. 7,4. **P. karolinae*, UF 259926, Oxfordian, Poland, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Diogenicheles FRAAIJE, KRZEMIŃSKI, VAN BAKEL, KRZEMIŃSKA, & JAGT, 2014, p. 682 [**D. theodora*, p. 683, fig. 2A, 3A; OD]. Shield well calcified, longer than wide; post-frontal ridge weak, arcuate; massetic region longer than wide, widest anteriorly, weakly defined; anterior branchial area narrow, widest anteriorly; cervical groove deep, straight axially, then arcing anteriorly in straight segment, then curving laterally. *Upper Jurassic (Oxfordian)*: Poland. *Upper Jurassic (Kimmeridgian)*: Germany.—FIG. 7,5. **D. theodora*, ISEA I-F/MP/3957/1533/08, Oxfordian, Poland, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Eotylaspis VAN BAKEL, FRAAIJE, JAGT, & ARTAL, 2008, p. 148 [**E. wehnerae*, p. 149, fig. 2E–F, 5B; OD]. Shield apparently approximately as long as wide; rostrum triangular, well developed; post-frontal ridge strong, arcuate; central gastric groove strong, only developed anteriorly; massetic region appearing to have been small; keraial region inflated; cervical groove apparently strong. *Upper Jurassic (Oxfordian–Kimmeridgian)*: Germany.—FIG. 6,9. **E. wehnerae*, holotype, MAB k.2461, scale bar 1 cm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Masticacheles FRAAIJE, KRZEMIŃSKI, VAN BAKEL, KRZEMIŃSKA, & JAGT, 2014, p. 684 [**M. longirostris*; OD]. Shield well calcified, slightly longer than wide; rostrum long, wide, strong; post-ocular projections short, sharp; post-frontal ridge weak

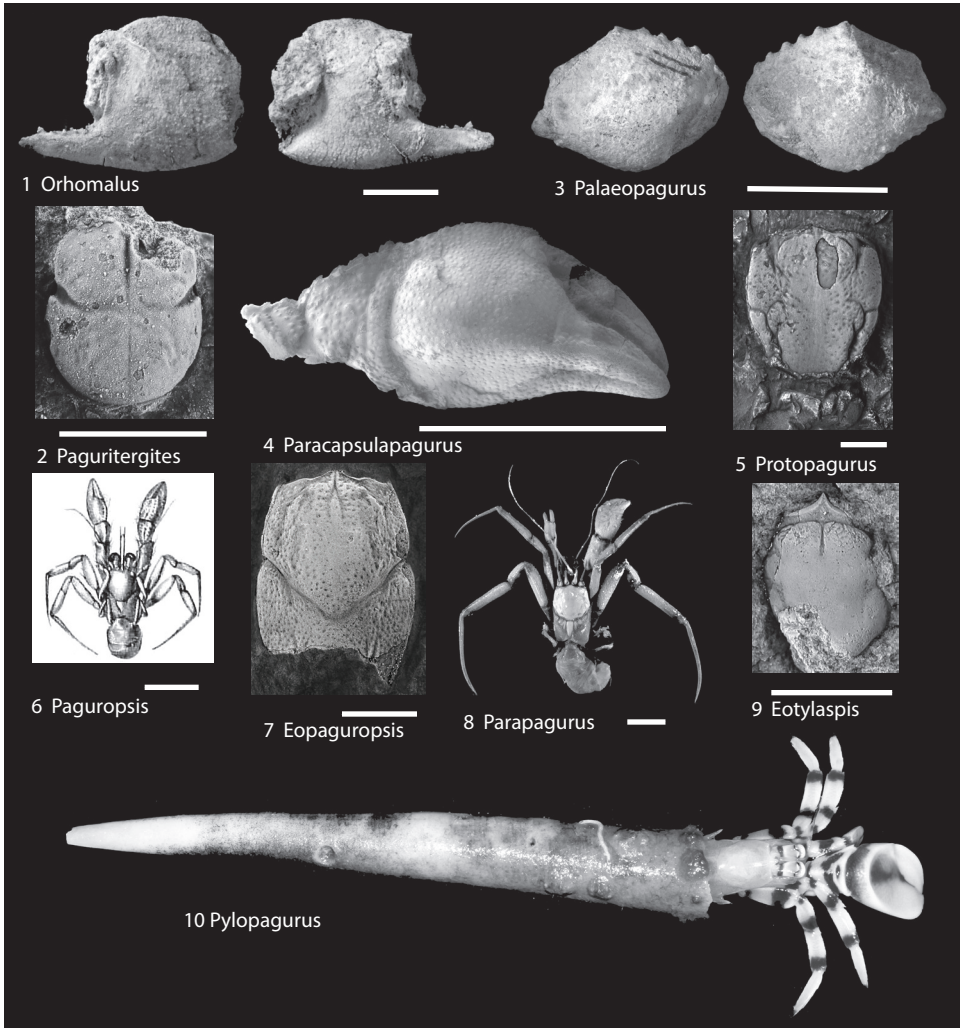


FIG 6. Diogenidae, Paguridae, Parapaguridae, Pilgrimchelidae, Xylopaguridae, (p. 6, 8, 10–12, 20).

axially and deeper laterally; central gastric groove weak to moderately deep; massetic region with a weak transverse groove, wide; anterior branchial area arcuate, wider anteriorly; keraial region lobate, best developed anteriorly; cervical groove deep; shield surface with short, transverse scabrous ridges. *Upper Jurassic–Lower Cretaceous. Upper Jurassic (Oxfordian)*: Poland. *Upper Jurassic (Kimmeridgian)*: Germany. *Upper Jurassic (Tithonian)*: Austria, Czech Republic. *Lower Cretaceous (Berriasian)*: Czech Republic.—FIG. 7,6. **M. longirostris*, ISEA I-F/MP/6194/1533/08, Oxfordian, Poland, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Family PROBEEBIDAE Boone, 1926

[Probecbidae, BOONE, 1926, p. 73]

Probeebei BOONE, 1926, p. 73 [**P. mirabilis*, p. 73; OD]. Carapace with strong, spinose ornamentation, rostrum long, extending well beyond eyestalks; pleonites spinose, telson with transverse suture; chelipeds equal. *Lower Cretaceous (Albian)–Holocene*: Eastern equatorial Pacific Ocean.—FIG. 7,8. **P. mirabilis*, Holocene, equatorial eastern Pacific Ocean (image from Boone).

Family PYLOCHELIDAE Bate, 1888

[Pylochelidae BATE, 1888, p. 10] [=Parapylochelinae FOREST, 1987, p. 135]

Carapace well calcified anteriorly and almost always symmetrical, sometimes operculiform; second and third pereopods long; fourth and fifth pereopods subchelate; pleon straight, rarely asymmetrical, somites calcified; telson well developed, with or without transverse suture. [Emended from DAVIE, 2002, p. 109; TUDGE, ASAKURA, & AHYONG 2012, p. 306.] *Middle Jurassic (Bajocian)–Holocene.*

Subfamily PYLOCHELINAE Bate, 1888

[*nom. transl.* FOREST, 1987, *ex* Pylochelidae BATE, 1888, p. 10]

Anterior calcified shield of carapace separated from posterior carapace; massetic region faint or absent, keraial region absent; *linea transversalis* medially interrupted; telson composed of two plates; fourth pereopods with propodus ornamented with line of setae ventrally. [Emended from FOREST, 1987, p. 33; DAVIE, 2002, p. 111.] *Upper Jurassic (Oxfordian)–Holocene.*

Pylocheles A. MILNE EDWARDS, 1880, p. 38 [**P. agassizi*; M; = *Pylochelese partitus* BENEDICT, 1901, p. 775, fig. 5]. Carapace longer than wide, shield rectangular; posteriorly partially calcified, *linea transversalis* comprised of two arcs laterally, not crossing midline of carapace; cervical groove strong, V-shaped axially, not intersecting lateral margins of carapace; rostrum weak; post-frontal ridge weak; chelipeds equal and symmetrical; sixth tergite of pleon long, lateral incision; telson divided into two parts. [Emended from FOREST, 1987, p. 41.] *Holocene*: Indo-Pacific Ocean.—FIG. 9,1. **P. agassizi*, MNHN-IU-2013-18965, Holocene, Caribbean Sea (photo by L. Corbari, MNHN).

Ammpylocheles VAN BAKEL, FRAAIJE, JAGT, & ARTAL, 2008, p. 147 [**A. mclaughlinae*; OD]. Carapace rectangular, longer than wide, well calcified anteriorly and posterior to cervical groove; post-frontal ridge strong, central gastric groove short and deep; region just posterior to post-frontal ridge with transverse scabrous ridges; massetic region long, widest anteriorly, with a small, linear subdivision ventrally; cervical groove deep, concave forward axially, then arcing to parallel lateral margins, nearly joining submassetic groove anteriorly to define a triangular submassetic region; region posterior to cervical groove with sparsely scattered pits. *Upper Jurassic–Lower Cretaceous. Upper Jurassic (Oxfordian)*: Germany, Poland. *Upper Jurassic (Kimmeridgian)*: Germany. *Upper Jurassic (Tithonian)*: Austria, Czech Republic. *Lower Cretaceous (Berriasian)*: Czech Republic.—FIG. 9,2. **A. mclaughlinae*, holotype, MAB k.2454, Kimmeridgian, Germany, scale bar 5 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Subfamily PARAPYLOCHELINAE Forest, 1987

[Parapylochelinae FOREST, 1987, p. 135]

Anterior calcified shield much shorter than the posterior region; well delineated massetic and keraial regions; *linea transversalis* continuous; fourth pereopods weakly subchelate; telson composed of one plate, elongate. [Emended from FOREST, 1987, p. 135]. *Upper Jurassic (Kimmeridgian)–Holocene.*

Parapylocheles ALCOCK, 1901, p. 213 [**Pylocheles scorpio* ALCOCK, 1894, p. 244; M]. Shield rectangular, longer than wide; rostrum small; cervical groove deep, intersecting lateral margins; posterior region of carapace longer than shield, mostly calcified; cardiac region large, bounded laterally by two subparallel grooves; chelipeds elongate, asymmetrical, right slightly longer and wider than left; pereopods 2 and 3 long, pereopod 4 subchelate; somite 1 of pleon strongly calcified; somite 6 rectangular, longer than wide, with a median groove and two strong posterolateral incisions; telson entire, longer than wide, posterior margin rounded. [Emended from FOREST, 1987, p. 135.] *Holocene*: Indo-Pacific Ocean.—FIG. 7,1. **P. scorpio* (ALCOCK), MNHN-IU-2013-877, Holocene, Papua New Guinea (photo by T.-Y. Chan and C. W. Lin, MNHN).

Housacheles FRAAIJE, VAN BAKEL, JAGT, & SKUPIEN, 2013, p. 253 [**H. timidus*; OD]. Rostrum with broad base, spinose, narrowly rimmed, triangular rostrum; long post-ocular projections, longer than rostrum; well-defined, transversely convex post-frontal ridges; central gastric groove very short; massetic region narrow, elongate; anterior branchial area much shorter than massetic region, triangular; massetic, submassetic and keraial grooves weak; keraial region only defined laterally; cervical groove broadly convex anteriorly, deep; weak pustulose ridge present just anterior to cervical groove; very small smooth portion of carapace preserved posterior to cervical groove. *Upper Jurassic (Kimmeridgian)*: Germany. *Upper Jurassic (Tithonian)*: Czech Republic.—FIG. 7,2. **H. timidus*, holotype, MAB k.3286, Tithonian, Czech Republic, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Mesoparapylocheles FRAAIJE, KLOMPMAKER, & ARTAL, 2012, p. 86 [**M. michaeljacksoni*; OD]. Shield well calcified, longer than wide, regions distinct; rostrum broadly triangular; blunt post-ocular projections; very weak post-frontal ridge; massetic regions slightly longer than wide, very well inflated; anterior branchial area much smaller than massetic region; keraial groove very strong and united with cervical groove; post-cervical groove deep, comprised of two short segments; branchiocardiac groove weaker; cardiac region strongly developed.

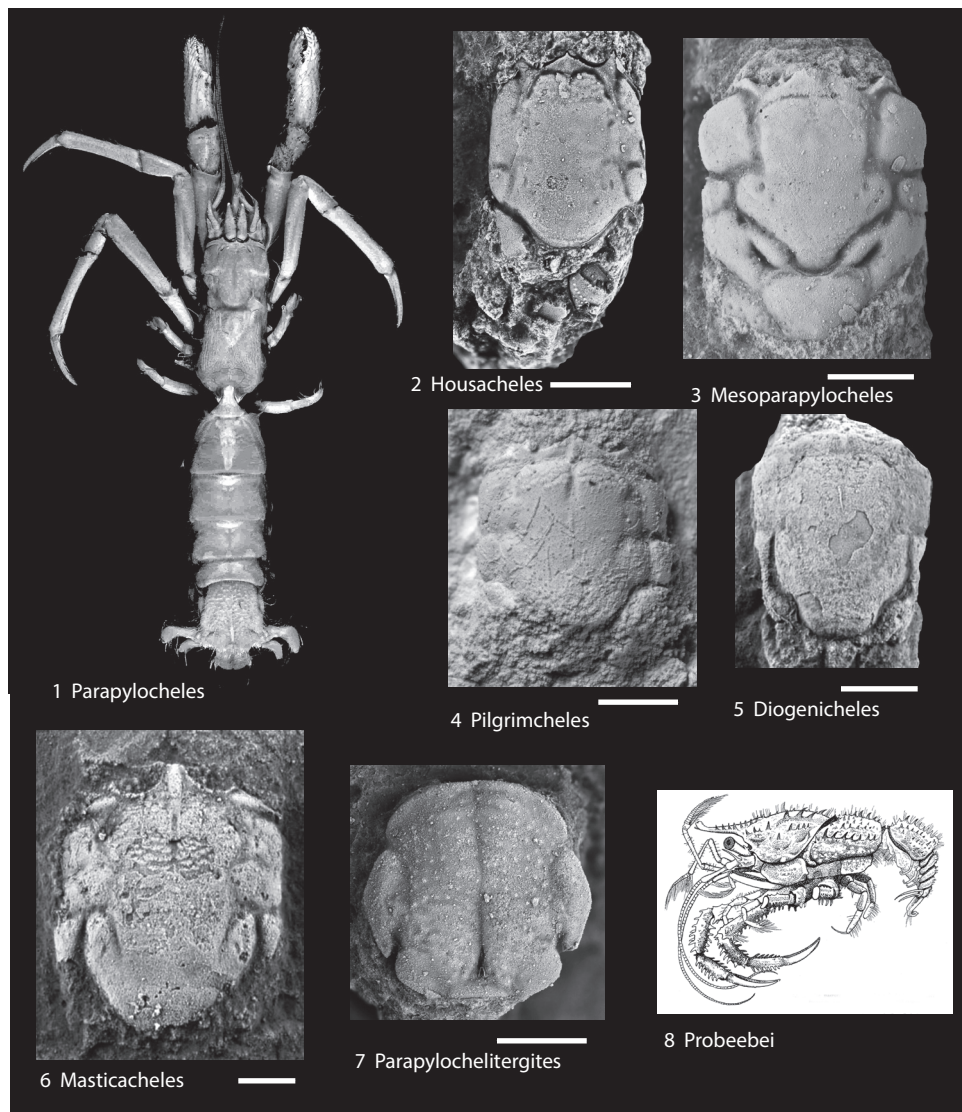


FIG 7. Pilgrimchelidae, Probeebeidae, Pylochelidae (p. 12–15).

Upper Jurassic–Lower Cretaceous. Upper Jurassic (Kimmeridgian): Germany. *Upper Jurassic (Tithonian):* Austria, Czech Republic. *Lower Cretaceous (Berriasian):* Czech Republic. *Lower Cretaceous (Albian):* Spain.—FIG. 7.3. **M. michaeljacksoni*, holotype, MGSB 78333, Albian, Spain, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Parapylochelitergites FRAAIJE, ARTAL, VAN BAKEL, JAGT, & KLONPMAKER, 2013, p. 110 [**P. pustulosus*; OD]. Sixth pleonal tergite convex, sub-rounded, width and length approximately equal; anterior

rim weak; longitudinal median groove moderately deep; lateral groove convex axially; lateral bulge convex laterally; posterior notches in lateral margins deep; entire surface finely granular. *Lower Cretaceous (Albian):* Spain.—FIG. 7.7. **P. pustulosus*, holotype, MGSB 79776, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Subfamily POMATOCHELINAE
Stebbing, 1914

[*nom. transl.* FOREST, 1987, p. 113]

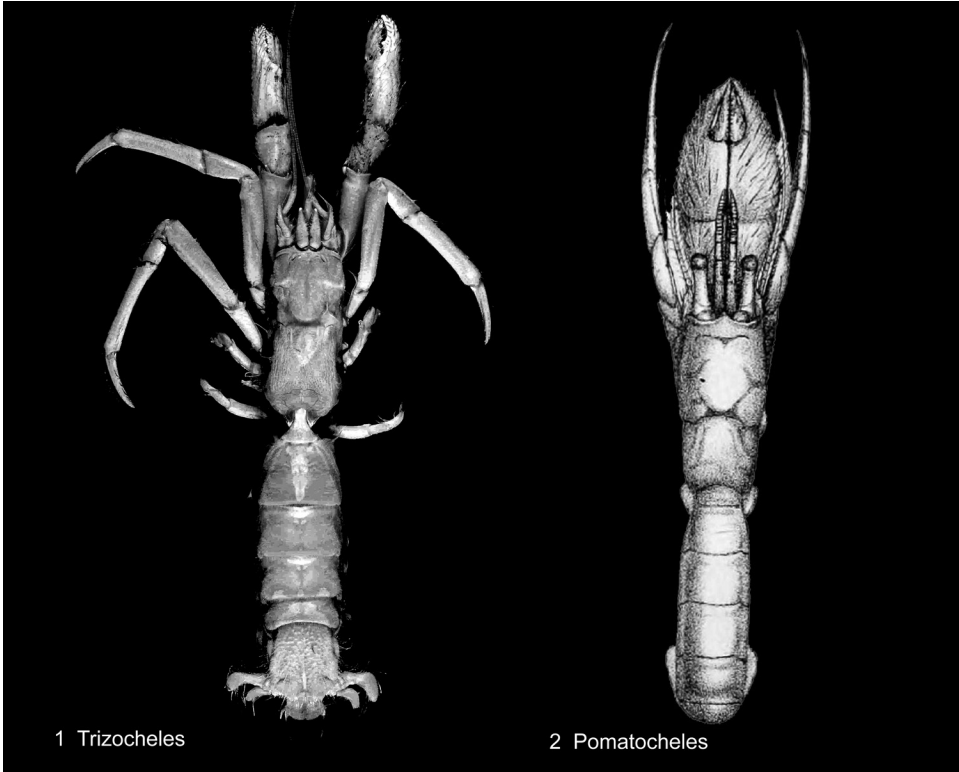


FIG 8. Pylochelidae (p. 16).

Anterior calcified shield rectangular; massetic region present; *linea transversalis* continuous; chelipeds operculiform; fourth pereiopods subchelate; telson longer than wide, with two deep lateral incisions and a strong median groove posteriorly. [Emended from FOREST, 1987, p. 113.] *Holocene* (extant).

Pomatocheles MIERS, 1879, p. 49 [**P. jeffreysii* MIERS, 1879, p. 49, pl. 3,2; M]. As for subfamily. *Holocene*: Japan, western tropical Pacific; Indian Ocean.—FIG. 8,2. **P. jeffreysii*, *Holocene*, northwestern Pacific (Miers, 1879, pl. 3,2).

Subfamily TRIZOCHELINAE Forest, 1987

[Trizochelinae FOREST, 1987, p. 155]

Anterior calcified shield of carapace separated from posterior carapace; massetic and keraial regions faintly present or absent; *linea transversalis* not medially interrupted; telson a single plate; fourth pereiopods with

propodus ornamented imbricate setae; chelipeds not forming a complete operculum; pleonal somites, pleopods, and uropods symmetrical. [Emended from FOREST, 1987, p. 155; DAVIE, 2002, p. 112; POORE & AHYONG, 2023, p. 344.] *Upper Jurassic (Oxfordian)–Holocene*.

Trizocheles FOREST, 1987, p. 155 [**Pylocheles spinosus* HENDERSON, 1888, p. 101, pl. XI, fig. 1; OD]. Anterior calcified shield of carapace about as long as or longer than posterior carapace; telson with lateral notches about half the distance posteriorly, posterior margin with axial concavity. [Emended from POORE & AHYONG, 2023, p. 345]. *Holocene*: Pacific and Indian Oceans.—FIG. 8,1. *T. manningi* FOREST, 1987, MNHN-IU-2014-23144, *Holocene*, Papua New Guinea, scale unknown (photo by L. Corbari, MNHN).

Cretatrizocheles FRAAIJE, KLOMPMAKER, & ARTAL, 2012, p. 88 [**C. olazagutiensis*, p. 88; OD]. Shield slightly wider than long; rostrum wide, triangular; post-frontal ridge strong, concave axially, extending into long submassetic grooves that converge slightly posteriorly; central gastric groove very short;

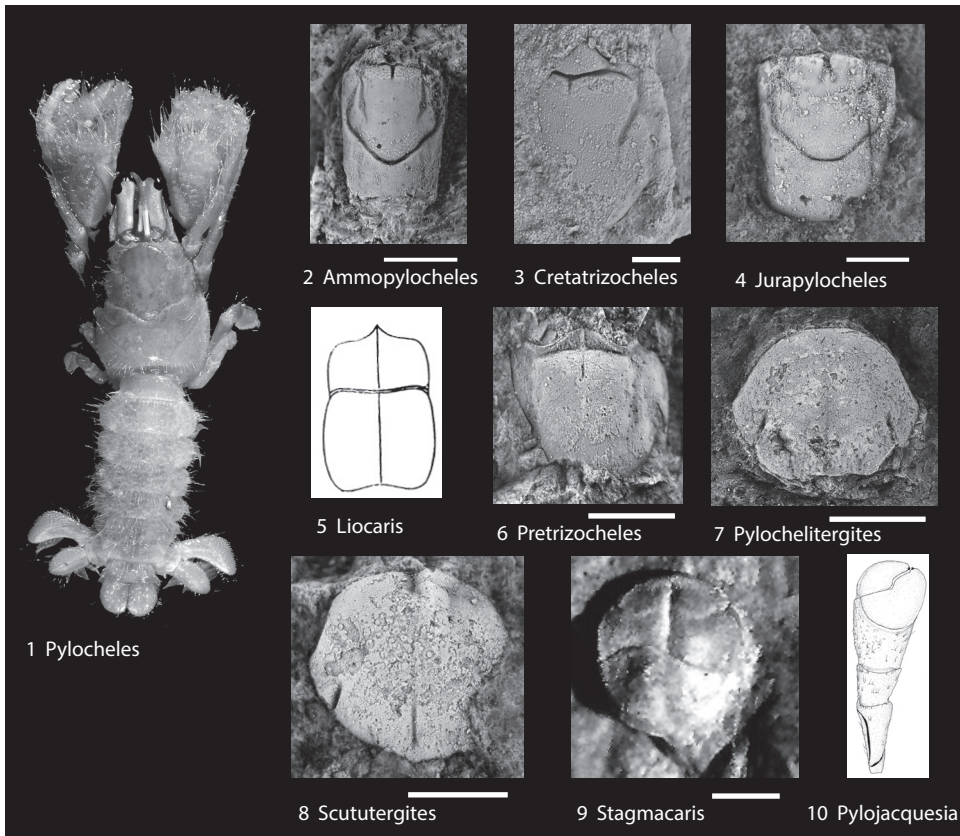


FIG 9. Pylochelidae, Pylojacquesidae (p. 14–18).

massetic region short, anterior branchial area long; keraial region ovate. *Upper Jurassic (Tithonian)*: Austria. *Lower Cretaceous (Albian)*: Spain.—FIG. 9,3. **C. olazagutiensis*, MAB k.3195, Albian, Spain, scale bar 1 mm (new; photo by A. Klompmaker, University of Alabama, Tuscaloosa, AL, USA).

Jurapylocheles VAN BAKEL, FRAAIJE, JAGT, & ARTAL, 2008, p. 146 [*J. malutka*, p. 146; OD]. Carapace rectangular, approximately as wide as long; rostrum very small, margin sloping posteriorly away from rostrum on either side, with small spinose post-ocular and post-antennal projections; post-frontal ridge moderately developed, central gastric groove comprised of two segments that diverge posteriorly; massetic region elongate, wider anteriorly; anterior branchial area small, narrow; cervical groove deep, straight axially, then arcing anteriorly to parallel lateral margins; massetic groove long, converging axially posteriorly. *Upper Jurassic (Oxfordian)*: Germany, Poland. *Upper Jurassic (Kimmeridgian)*: Germany.—FIG. 9,4. *J. iwona*e FRAAIJE, KRZEMIŃSKA, VAN BAKEL, KRZEMIŃSKA, & JAGT, 2012, MAB k.3353, Kimmeridgian, Germany, scale bar 5 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Pretrizocheles FRAAIJE, ROBINS, VAN BAKEL, JAGT, & BACHMAYER, 2019, p. 282 [**P. cocullo*; OD]. Shield slightly wider than long; rostrum broadly triangular, axially keeled; small post-ocular projections; post-frontal ridge straight central gastric groove weak; massetic regions long, ovate; anterior branchial areas small; submassetic grooves straight, weak. *Upper Jurassic (Tithonian)*: Austria.—FIG. 9,6. **P. cocullo*, NMHW 2017-0093-0005, scale bar 5 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Pylochelitergites FRAAIJE, KRZEMIŃSKA, VAN BAKEL, KRZEMIŃSKA, & JAGT, 2012, p. 120 [**P. westerbergensis*; OD]. Sixth pleonal tergite rounded-hexagonal, anterior margin strongly convex, posterior margin moderately convex, with deep, narrow anteriorly-directed notches on posterolateral margins. *Upper Jurassic–Lower Cretaceous. Upper Jurassic (Oxfordian)*: Poland. *Upper Jurassic (Kimmeridgian)*: Germany. *Upper Jurassic (Tithonian)*: Austria, Czech Republic. *Lower Cretaceous (Albian)*: Spain.—FIG. 9,7. **P. westerbergensis*, holotype, MAB k.3161, Kimmeridgian, Germany, scale bar 2 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

UNPLACED AT SUBFAMILY LEVEL

These taxa are based on the sixth somites of the pleon.

Liocaris VAN STRAELEN, 1925, p. 334 [**L. quadratus*, p. 335, pl. X, 7–8; M]. Sixth pleonal tergite of minute size, subrectangular, longer than wide, dorsoventrally convex, with longitudinal and transverse grooves. *Middle Jurassic (Bajocian)*: France.—FIG. 9,5. **L. quadratus* (Van Straelen, 1925, fig. 152).

Scutertegites FRAAIJE, 2014, p. 140 [**S. anteroindentatus*; OD]. Sixth pleonal tergite subcircular; notch extending into short groove at anterior axis; groove developed posteriorly and axially but not intersecting posterior margin; with deep, narrow anteriorly directed notches on posterolateral margins. *Upper Jurassic (Kimmeridgian)*: Germany.—FIG. 9,8. **S. Anteroindentatus*, MAB k.3357, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Stagmacaris SCHWEIGERT, 2006, p. 86 [**S. quenstedtii*; OD]. Sixth pleonal tergite of minute size; oval to subrounded, anteriorly and laterally rimmed; with longitudinal groove; small, short anteriorly-directed notches on posterolateral margins, notches extending into arcuate grooves that intersect longitudinal groove. *Upper Jurassic (Oxfordian)*: Poland. *Upper Jurassic (Kimmeridgian)*: Germany.—FIG. 9,9. **S. quenstedtii*, Kimmeridgian, Germany, holotype, IGT, Quenstedt Collection, unnumbered, scale bar 2 mm (new; photo by G. Schweigert, Staatliches Museum für Naturkunde, Stuttgart, Germany).

Family PYLOJACQUESIDAE

McLaughlin & Lemaitre, 2001

[Pylojacquesidae MCLAUGHLIN & LEMAITRE, 2001b, p. 1063]

Cephalothorax with distinct cervical groove and *linea transversalis*; right major chelae rounded, operculate, propodus nesting into concave distal margin of carpus; first pleonal somite continuous with last thoracic somite, suture visible; pleonal somites membranous except sixth tergite. [Emended from MCLAUGHLIN & LEMAITRE, 2001b, p. 1063.] *Holocene*: Australia.

Pylojaquesia MCLAUGHLIN & LEMAITRE, 2001b, p. 1063 [**P. colemani*, p. 1066, fig. 1–4, fig. 5a–d, f–g; OD]. As for family. *Holocene*: Australia.—FIG. 9,10. **P. colemani*, ZMB 5204, right male cheliped, *Holocene*, Australia (McLaughlin & Lemaitre, 2001b, fig. 4a).

Family SCHOBERTELLIDAE

Schweigert, Fraaije, Havlik, & Nützel, 2013

[Schobertellidae SCHWEIGERT, FRAAIJE, HAVLIK, & NÜTZEL, 2013, p. 804]

Shield and posterior part of carapace surface ornamented with fine, forwardly directed tubercles; deep cervical groove incising anterolateral margin; anterior branchial region present, weak mesogastric and epibranchial regions may be present; right cheliped larger than left; propodi subquadratic, upper and lower side convex; robust and moderately long fingers, with terminally bulbous index, occlusal surfaces of both coarsely dentate; tubercles on chelipeds forwardly directed; bigger ones with serrate proximal margin, commonly arranged in terraces. [Emended from SCHWEIGERT & others, 2013, p. 804.] *Lower Jurassic (Pliensbachian)*–*Upper Jurassic (Tithonian)*.

Schobertella SCHWEIGERT, FRAAIJE, HAVLIK, & NÜTZEL, 2013, p. 804 [**S. simonsenetlangi*; OD]. Carapace with marked, widely based rostrum, laterally grading into orbits; surface of carapace ornamented with fine, forwardly directed tubercles; cervical groove deep, small triangular anterior branchial region separated anteriorly by cervical groove and posteriorly by short branchial groove, no other distinct subdivisions of carapace; right cheliped slightly larger than left, propodi subquadrate, upper and lower margins convex; robust and moderately long fingers with terminally bulbous index, occlusal surfaces of both coarsely dentate; tubercles on chelipeds forwardly directed, larger ones with serrate proximal margin, commonly arranged in terraces. [Emended from SCHWEIGERT & others, 2013, p. 804.] *Lower Jurassic (Pliensbachian)*: Germany.—FIG. 10,1. **S. simonsenetlangi*, holotype BSPG 1980III277, scale bar 1 mm (new; photo by G. Schweigert, Staatliches Museum für Naturkunde, Stuttgart, Germany).

Cryptopagurus SCHWEIGERT, FRAAIJE, HAVLIK, & NÜTZEL, 2013, p. 810 [**C. svenhoffmanni*; OD]. Chelae with rectangular propodus, ornamented with longitudinal rows of tubercles; fingers long, strongly dentate. [Emended from SCHWEIGERT & others, 2013, p. 810.] *Lower Jurassic (Pliensbachian)*: Germany.—FIG. 10,2. **C. svenhoffmanni*, holotype, SMNS 70080, scale bar 2 mm (new; photo by G. Schweigert, Staatliches Museum für Naturkunde, Stuttgart, Germany).

Daciapagurus FRANȚESCU, FELDMANN, SCHWEITZER, LAZĂR, & STOICA, 2018, p. 55 [**D. minusculus*, p. 56, fig. 6.1–6.2; OD]. Cephalic region of cephalothorax bounded posteriorly and laterally by deeply incised cervical groove that crosses midline as two straight elements forming V-shaped pattern; rostrum a sulcate, finely rimmed, equilateral triangle bounded by shallow orbital notches; mesogastric region defined by relatively strong anteriorly convergent grooves posteriorly and coarse granules overall; thoracic region incomplete, with shallow

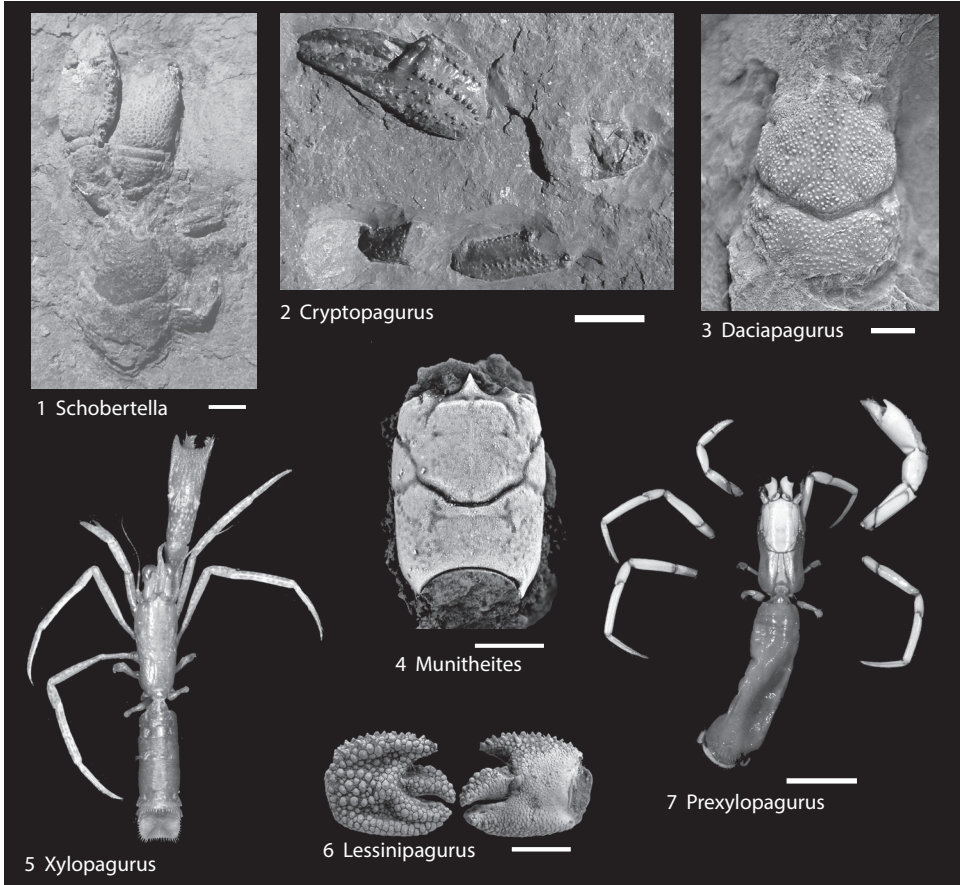


FIG 10. Schobertellidae, Xylopaguridae (p. 18–20).

grooves defining epibranchial region. *Upper Jurassic (Kimmeridgian)*: Germany. *Upper Jurassic (Kimmeridgian–Tithonian)*: Romania.—FIG. 10,3. **D. minisculus*, holotype, LPBIIIart291, Kimmeridgian–Tithonian, Romania, scale bar 2 mm (new). **Munitheites** LÖRENTHEY in LÖRENTHEY & BEURLEN, 1929, p. 78 [*M. palfyi*, pl. 3,15; M]. Carapace rectangular, narrowing slightly posteriorly; rostrum triangular; postocular spines short, triangular; post-frontal ridge well developed, diverging slightly posteriorly; central gastric groove absent; massetic regions approximately as wide as long, anterior branchial areas triangular, approximately as long as massetic regions; cervical groove deep, with anterior and posterior branches that intersect lateral margin and bound the anterior branchial area; posterior margin concave; ornamentation consisting of scattered pores. *Upper Jurassic (Tithonian)*: Austria, Romania.—FIG. 10,4. *M. kuepperi* FRAAIJE, ROBINS, VAN BAKEL, JAGT, & BACHMAYER, 2019, holotype, NHMW 1990/0041/3306, Tithonian, Austria, scale bar 1 mm (new; photo by B. W. M.

van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Family XYLOPAGURIDAE Gašparič, Fraaije, Robin, & De Angeli, 2016

[Xylopaguridae GAŠPARIČ, FRAAIJE, ROBIN, & DE ANGELI, 2016, p. 468]

Shield longer than wide, rostrum very short; branchiostegite with narrow calcified area ventral to *linea anomurica*, carapace well calcified posteriorly; cervical groove and *linea transversalis* all well defined; tergite of sixth pleonal somites with crispate edges, strongly calcified; telson and uropods symmetrical; chelipeds heterochelous, right usually larger, with distally directed projected above movable finger. [Emended from LEMAITRE, 1995, p. 4.] *Eocene (Lutetian–Priabonian)–Holocene.*

Xylopagurus A. MILNE-EDWARDS, 1880, p. 37 [**X. rectus*; M]. Shield longer than wide, rostrum very short; branchiostegite with narrow calcified area ventral to *linea anomurica*, carapace well calcified posteriorly; cervical groove and *linea transversalis* all well defined; tergite of pleonal somite 6 with crispate edges, strongly calcified; telson and uropods symmetrical; chelipeds heterochelous, right usually larger, with distally directed projected above movable finger. *Holocene*: western Atlantic Ocean and eastern Pacific Ocean.—FIG. 10,5. **X. rectus*, MNHN-IU-2013-19199, *Holocene*, Caribbean Sea (photo by J. Poupin, MNHN).

Lessinipagurus BESCHIN, DE ANGELI, CHECCHI, & ZARANTELO, 2012, p. 29 [**L. granulatus*; OD]. Right chela overall rounded; manus shorter than high, outer surface ornamented with coarse tubercles of varying sizes, inner surface with smaller, scabrous ridges; upper and lower surfaces with larger tubercles; fixed finger short, with strongly arcuate lower margin; distal margin extending into short, finger-like projection at position of articulation with movable finger. *Eocene (Lutetian–Priabonian)*: Italy.—FIG. 10,6. **L. granulatus*, holotype MCZ 2732, scale bar 1 cm (new; photo by A. De Angeli, Associazione Amici del Museo Zannato, Montecchio Maggiore, Vicenza, Italy).

Paguritergites FRAAIJE, ARTAL, VAN BAKEL, JAGT, & KLOMPMAKER, 2013, p. 114 [**P. yvonnecooleae*; OD]. Tergite with longitudinal and transverse median grooves intersecting centrally, transverse groove leading into deep lateral notches; surface with fine wrinkled ornamentation; anterior rim smooth; posterior rim convex. [Emended from FRAAIJE & others, 2013, p. 114.] *Lower Cretaceous (Albian)*: Spain.—FIG. 6,2. **P. yvonnecooleae*, holotype, MGSB 79779, scale bar 1 mm (new; photo by B. W. M. van Bakel, Oertijdmuseum, Boxtel, The Netherlands).

Pregylopagurus GAŠPARIČ, FRAAIJE, ROBIN, & DE ANGELI, 2016, p. 470 [**Xylopagurus anthonii* LEMAITRE, 1995, p. 14, fig. 7d, fig. 11–13; OD]. Shield 1.5 times as long as wide, rostrum very short, line-a-d present; right cheliped very large, fingers with molariform teeth and calcareous tips; left cheliped slender, fingers long; pereopod 5 subchelate; pleonal somite 6 with crenulate edges. [Emended from LEMAITRE, 1995, p. 14.] *Holocene*: Belize, New Caledonia, Panama, Philippines.—FIG. 10,7. **P. anthonii* (LEMAITRE), paratype, MNHN-IU-2008-15662, *Holocene*, Caribbean, scale bar 1 cm (photo by M. Van Weddingen, MNHN).

ABBREVIATIONS OF MUSEUM REPOSITORIES

- BGS: British Geological Survey, Nottingham, UK
 BSPG: Bayerische Staatsammlung für Paläontologie und historische Geologie München, Munich, Germany
 CBM-ZC: Natural History Museum and Institute, Chiba, Japan
 CM: Canterbury Museum, Christchurch, New Zealand
 CNRS: Centre national de la recherche scientifique, Paris, France
 GSM: Georgia Southern University Museum, Statesboro, Georgia, USA
 IGT: Institut für Geowissenschaften der Universität Tübingen, Germany
 INPN: Inventaire National du Patrimoine Naturel, Muséum National d'histoire naturelle, Paris, France
 ISEA: Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Kraków, Poland
 LPB: Laboratory of Paleontology, Department of Geology and Paleontology, University of Bucharest, Romania
 MAB k: Oertijdmuseum, Boxtel, The Netherlands
 MCZ: Museo Civico “G. Zannato” di Montecchio Maggiore, Vicenza, Italy
 MGSB: Museo Geológico del Seminario de Barcelona, Barcelona, Spain
 MNHN: Muséum National d'histoire naturelle, Paris, Crustacean Collection, France
 MPZ: Museo de Ciencias Naturales de la Universidad de Zaragoza, Spain
 MSNM: Museo Civico di Storia Naturale di Milano, Italy
 MSNVR: Museo Civico di Storia naturale di Verona, Italy
 NHMW: Naturhistorisches Museum Wien (Natural History Museum of Vienna), Austria
 SENCN: Laboratoire de Géologie, Université Cheikh Anta Diop, Dakar, Senegal
 SM: Sedgwick Museum, Cambridge University, UK
 SMNS: Staatliches Museum für Naturkunde, Stuttgart, Germany
 UF: Florida Museum, University of Florida, Gainesville, Florida, USA
 USNM: United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA
 VR: Museo di Storia naturale di Verona, Italy
 YPM: Yale Peabody Museum, Division of Invertebrate Zoology, New Haven, Connecticut, USA
 ZMB: Naturhistorisches Forschungsinstitut Museum für Naturkunde zu Berlin, Germany

REFERENCES

- Ahyong, S. T. 2010. The Marine Fauna of New Zealand: King Crabs of New Zealand, Australia and the Ross Sea (Crustacea: Decapoda: Lithodidae). NIWA Biodiversity Memoir 123. 196 p.
- Alcock, Alfred. 1894. On the results of deep-sea dredging during the season 1890–91 (continued). XXV: Natural History notes from H. M. Indian Marine Survey Steamer 'Investigator,' Commander R. F. Hoskyn, R. N., commanding. *Annals and Magazine of Natural History* (series 6) 13:225–245.
- Alcock, Alfred. 1901. A descriptive catalogue of the Indian deep-sea Crustacea Decapoda Macrura and Anomala in the Indian Museum being a revised account of the deep-sea species collected by the Royal Indian Marine Survey Ship Investigator. Trustees of the Indian Museum. Calcutta. 286 p., pl. 1–3.
- Ascanius, Peder. 1767–1805. *Icones rerum naturalium, ou figures enluminées d'histoire naturelle du Nord*. Copenhagen. 5 parts, 36 p., 50 pl. Part 1 (1867), 22 p., pl. 1–10; Part 2 (1772), 8 p., pl. 11–20; Part 3 (1775), 6 p., pl. 21–30; Part 4 (1777), 6 p., pl. 31–40; Part 5 (1805), 8 p., pl. 41–50.
- Ayón-Parente, Manuel, & M. E. Hendrickx. 2010. A new genus and new species of hermit crab (Crustacea: Anomura: Paguroidea: Diogenidae) from the eastern tropical Pacific. *Zootaxa* 2677:49–59.
- van Bakel, B. W. M., R. H. B. Fraaije, J. W. M. Jagt, & P. Artal, 2008. An unexpected diversity of Late Jurassic hermit crabs (Crustacea, Decapoda, Anomura) in Central Europe. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 250:137–156.
- Bate, C. S. 1888. Report on the Crustacea Macrura dredged by H.M.S. Challenger during the years 1872–1876. Report on the scientific results of the voyage of H.M.S. Challenger during the years 1873–1876. *Zoology* 24(52):1–942.
- Bell, Thomas. 1844–1853. *A History of the British stalk-eyed Crustacea*. John Van Voorst. London. lxx + 386 p. [Issued separately in parts (1846), p. 144–260].
- Benedict, J. E. 1895. Descriptions of new genera and species of crabs of the family Lithodidae with notes on the young of *Lithodes camtschaticus* and *Lithodes brevipes*. *Proceedings of the United States National Museum* 17:479–488.
- Benedict, J. E. 1901. Four new symmetrical hermit crabs (pagurids) from the West India region. *Proceedings of the United States National Museum* 23(1236):771–778.
- Beschin, Claudio, Alessandra Busolini, Giuliano Tessier, R. H. B. Fraaije, & J. W. M. Jagt. 2021. The first Cenozoic 'blanket hermit crab' (Anomura, Paguroidea): A new genus and species from the Eocene of northeast Italy. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 299:251–257.
- Beschin, Claudio, Antonio De Angeli, Andrea Checchi, & Giannino Zarantonello. 2012. *Crostacei del giacimento Eocenico di Grola Presso Spagnago di Cornedo Vicentino (Vicenza, Italia Settentrionale)* (Decapoda, Stomatopoda, Isopoda). Museo di Archeologie e Scienze Naturali "G. Zannato," Montecchio Maggiore. Italy. 99 p.
- Beurlen, Karl. 1925. Über Brachyuren- und Anomurenreste des schwäbischen Jura. *Neues Jahrbuch für Mineralogie, (Beilageband)* 52 (3):464–532, 2 fig.
- Birstein, Y. A., & L. G. Vinogradov. 1972. Craboids (Decapoda, Anomura, Lithodidae) of the Atlantic sector of the Antarctic, South America and South Africa. *Zoologicheskij Zhurnal* 51(3):351–363. In Russian.
- Bishop, G. A. 1991. The Coon Creek decapod assemblages of Northern Mississippi. *Mississippi Geology* 12:8–17.
- Boone, Lee. 1926. A new family of Crustacea. Preliminary technical description. *New York Zoological Society Bulletin* 29:73.
- Boone, Lee. 1932. The littoral crustacean fauna of the Galapagos Islands. Part II. Anomura. *Zoologica, Scientific Contributions of the New York Zoological Society* 14:1–62.
- Borradaile, L. A. 1907. On the classification of the decapod crustaceans. *Annals and Magazine of Natural History* (series 7) 19:457–486.
- Bosc, L. A. G. 1801. *Histoire naturelle des Crustacés, contenant leur description et leurs mœurs; avec figures dessinées d'après nature*. Tome premier. Deterville. Paris. 258 p., pl. 1–8.
- Bouvier, E.-L. 1895. Recherches sur les affinités des Lithodes & des Lomis avec les Paguridés. *Annales des Sciences Naturelles, Zoologie et Paléontologie* 18:157–213.
- Bouvier, E.-L. 1898. Sur quelques Crustacés anomures et brachyures recueillis par M. Diguët en Basse-Californie. *Bulletin du Muséum d'Histoire Naturelle* 4:371–384.
- Bouvier, E.-L. 1918. Sur une petite Collection de Crustacés de Cuba offerte au Muséum par M. de Boury. *Bulletin du Muséum National d'Histoire Naturelle* 24:6–15.
- Brandt, J. F. 1848. Die Gattung *Lithodes* Latreille nebst vier neuer ihr verwandten von Wosnessenski entdeckten, als Typen einer besondern Unterabtheilung (Tribus Lithodea) der Edward'shen Anomuren. *Bulletin de la Classe physico-mathématique de l'Académie Impériale des Sciences de Saint Pétersbourg* 7(11):171–176.
- Brandt, J. F. 1850. Vorläufige bemerkungen über eine neue aus zwei noch unbeschriebenen Gattungen und Arten gebildete Unterabtheilung (Hapalogastrica) der Tribus Lithodina, begleitet von einer Charakteristik der eben genannten Tribus der Anomuren. *Bulletin de la Classe Physico-Mathématique de l'Académie Impériale des Sciences de Saint-Petersbourg* 8(16–17):266–269.
- Brandt, J. F. 1851. *Krebse*. In A. T. von Middendorff, ed., *Reise in den äussersten Norden und Osten Sibiriens während der Jahre 1843 und 1844 mit allerhöchster Genehmigung auf Veranstaltung der Kaiserlichen Akademie der Wissenschaften zu St. Petersburg ausgeführt und in Verbindung mit vielen*

- Gelehrten herausgegeben 2 (Theil 1):77–148, pl. 5–6. St. Petersburg.
- Carter, James. 1886. On the decapod crustaceans of the Oxford Clay. *Quarterly Journal of the Geological Society, London* 42:542–559.
- Chan, T.-Y. 2010. Crustacean fauna of Taiwan: Crab-like anomurans (Hippoidea, Lithoidea and Porcellanidae). National Taiwan Ocean University. Keelung, Taiwan. 195 p.
- Chevreux, Edouard, & E.-L. Bouvier. 1892. Voyage de la goëlette Melita aux Canaries et au Sénégal. Note préliminaire sur les paguriens. *Bulletin de la Société Zoologique de France* 16:252–256.
- Chilton, Charles. 1911. Crustacea. In *Scientific Results of the New Zealand Government Trawling Expedition 1907*. Records of the Canterbury Museum 1(3):285–312.
- Curtiss, Anthony. 1938. A Short Zoology of Tahiti. Anthony Curtiss. Brooklyn. xvi + 193 p.
- Dana, J. D. 1851. Paguridae. *Conspectus Crustaceorum quae in Orbis Terrarum circumnavigatione, Carolo Wilkes e Classe Reipublicae Foederatae Duce, lexit et descripsit*. Proceedings of the Academy of Natural Sciences of Philadelphia 5:267–272.
- Dana, J. D. 1852a. On the classification of the Corystoidea, Paguridea, etc. *American Journal of Science and Arts (series 2)* 13:119–124.
- Dana, J. D. 1852b. *Conspectus Crustaceorum & c. Conspectus of the Crustacea of the exploring expedition under Capt. Wilkes, U.S.N. Paguridea, continued, and subtribe Megalopidea*. Proceedings of the Academy of Natural Sciences of Philadelphia 6:6–10.
- Dana, J. D. 1852c. Crustacea, Part I. In *United States Exploring Expedition. During the Years 1838, 1839, 1840, 1841, 1842. Under the Command of Charles Wilkes, U.S.N. C. Sherman*. Philadelphia. 13. viii + 685 p.
- Davie, P. J. F. 2002. Crustacea: Malacostraca: Eucarida (Part 2) Decapoda: Anomura, Brachyura. In A. Wells, & W. W. K. Houston, eds., *Zoological Catalogue of Australia*. CSIRO Publishing. Melbourne. 19.3B. 641 p.
- De Angeli, Antonio, & Fabio Caporiondo. 2017. I granchi eremiti (Crustacea, Decapoda, Anomura, Paguroidea) dell'Eocene medio di cava "Main" di Arzignano (Vicenza, Italia settentrionale). *Studi Trentini di Scienze Naturali* 96:11–32.
- DecaNet eds. 2023. DecaNet. Paguroidea Latreille, 1802. Accessed through: World Register of Marine Species [https://www.marinespecies.org/aphia.php?p=taxdetails&id=106687 on 2023-09-10].
- De Haan, Wilhelm. 1833–1850. Crustacea. In P. F. von Siebold, ed., *Fauna Japonica sive Descriptio Animalium, quae in Itinere per Japoniam, Jussu et Auspiciis Superiorum, qui summum in India Batava Imperium Tenent, Suscepto, Annis 1823–1830 Collegit, Notis, Observationibus et Adumbrationibus Illustravit*. J. Müller et Co. Lugduni Batavorum (Leyden). p. i–xvii, i–xxxi, ix–xvi, 1–243, pl. A–J, L–Q, 1–55, circular graph 2.
- Étallon, Auguste. 1861. Notes sur les Crustacés Jurassiques du bassin du Jura. *Mémoires de la Société de l'Agriculture, des Sciences et Lettres de la Haute Saône* 9:29–171, pl. 2.
- Fabricius, J. C. 1775. *Systema entomologiae, sistens insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus*. 832 p.
- Fabricius, J. C. 1787. *Mantissa insectorum sistens eorum species nuper detectas adiectis characteribus genericis, differentiis specificis, emendationibus, observationibus*. Tome I. C. G. Proft et Storch. Hafniae (Copenhagen). xvi + 348 p.
- Feldmann, R. M. 1998. *Palomolis debodeorum*, a new species of decapod crustacean from the Miocene of New Zealand: First notice of the Lithodidae in the fossil record. *New Zealand Journal of Geology and Geophysics* 41:35–38.
- Ferratges, F. A., Pedro Artal, & Samuel Zamora. 2021. New hermit crabs (Paguroidea, Anomura) from the Eocene of Huesca, Spain. *Boletín de la Sociedad Geológica Mexicana* 73(3):A070121 [doi:org/10.18268/bsgm2021v73n3a070121].
- Ferratges, F. A., Matúš Hyžný, & Samuel Zamora. 2021. Taphonomy and systematics of decapod crustaceans from the Aptian (Lower Cretaceous) in the Oliete Sub-basin (Teruel, Spain). *Cretaceous Research* 122: 104767 [doi:10.1016/j.cretres.2021.104767].
- Ferratges, F. A., Samuel Zamora, & Marcos Aurell. 2020. A new hermit crab out of its shell from the Eocene Arguis Formation, Huesca, Spain. *Acta Palaeontologica Polonica* 65:787–792.
- Filhol, Henri. 1884. Note sur quelques espèces nouvelles d'*Eupagurus recueillis* en Nouvelle-Zélande. *Bulletin de la Société philomatique de Paris (série 7)* 8(2):66–68.
- Forest, Jacques. 1987. Les Pylochelidae ou «Pagures symétriques» (Crustacea Coenobitoidea). *Mémoires du Muséum national d'Histoire naturelle (série A) Zoologie* 137:1–254, pl. 1–9.
- Forest, Jacques. 1995. Crustacea Decapoda Anomura: Révision du genre *Trizopagurus* Forest, 1952 (Diogenidae), avec rétablissement de deux genres nouveaux. In A. Crosnier, ed., *Résultats des Campagnes MUSORSTOM 13*. Mémoires du Muséum national d'Histoire naturelle (série A) Zoologie 163:9–149.
- Forskål Peter. 1775. *Descriptiones Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium; quae in Itinere Orientali Observavit Petrus Forskål*. Post Mortem Auctoris editit Carsten Niebuhr. Adjuncta est materia Medica Kahirina. Mölleri. Hafniae (Copenhagen). 19 + xxxiv + 164 p.
- Förster, Reinhard. 1985. Frühe Anomuren und Brachyuren (Decapoda, Crustacea) aus dem Mittleren Dogger. *Mitteilungen der Bayerischen Staatssammlung für Paläontologie und Historische Geologie* 25:45–60.
- Fraaije, R. H. B. 2014. Diverse Late Jurassic anomuran assemblages from the Swabian Alb and evolutionary history of paguroids based on carapace morphology. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 273:121–145.
- Fraaije, R. H. B., Pedro Artal, B. W. M. van Bakel, J. W. M. Jagt, & A. A. Klompmaker. 2013. An array of sixth abdominal tergite types of paguroid anomurnas (Crustacea) from the mid-Cretaceous of Navarra,

- northern Spain. *Netherlands Journal of Geoscience* 92 (2/3):109–117.
- Fraaije, R. H. B., B. W. M. van Bakel, Arne Iserbyt, & J. W. M. Jagt. 2011. New extinct Paguroidea (Crustacea, Decapoda, Anomura), with the first example of capsulated setae in the fossil record. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 262:247–255.
- Fraaije, R. H. B., B. W. M. van Bakel, & J. W. M. Jagt. 2017. A new paguroid from the Maastrichtian (upper Cretaceous, the Netherlands) and erection of a new family. *BSGF Earth Sciences Bulletin* 188(17):1–4.
- Fraaije, R. H. B., B. W. M. van Bakel, J. W. M. Jagt, & Pedro Artal. 2008. New decapod crustaceans (Anomura, Brachyura) from mid-Cretaceous reefal deposits at Monte Orobe (Navarra, northern Spain), and comments on related type-Maastrichtian material. *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique (Sciences de la Terre)* 78:193–208.
- Fraaije, R. H. B., B. W. M. van Bakel, J. W. M. Jagt, Sylvain Charbonnier, Guenter Schweigert, Géraldine Garcia, & Xavier Valentin. 2022. The evolution of hermit crabs (Crustacea, Decapoda, Anomura, Paguroidea) on the basis of carapace morphology: A state-of-the-art-report. *Geodiversitas* 44:1–16.
- Fraaije, R. H. B., B. W. M. van Bakel, J. W. M. Jagt, & Petr Skupien. 2013. First record of paguroid anomurans (Crustacea) from the Tithonian-lower Berriasian of Štramberk, Moravia (Czech Republic). *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 269:251–259.
- Fraaije, R. H. B., Claudio Beschin, Alessandra Busolini, Giuliano Tessier, J. W. M. Jagt, & B. W. M. van Bakel. 2020. *Joecalcinus*, a new hermit crab genus from the Eocene of northern Italy: The second Cenozoic representative of the extant family Calcinidae (Decapoda, Anomura). *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 296(1–2):101–105.
- Fraaije, R. H. B., A. A. Klompmaker, & Pedro Artal. 2012. New species, genera and a family of hermit crabs (Crustacea, Anomura, Paguroidea) from a mid-Cretaceous reef of Navarra, northern Spain. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 263:85–92.
- Fraaije, R. H. B., Wiesław Krzemiński, B. W. M. van Bakel, Ewa Krzemińska, & J. W. M. Jagt. 2012. The sixth abdominal tergites of paguroid anomurans: A newly recognized crustacean macrofossil type. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 266:115–122.
- Fraaije, R. H. B., Wiesław Krzemiński, B. W. M. van Bakel, Ewa Krzemińska, & J. W. M. Jagt. 2014. New Late Jurassic symmetrical hermit crabs from southern Polish Uplands, and early paguroid diversification. *Acta Paleontologica Polonica* 59:681–688.
- Fraaije, R. H. B., Cristina Robins, B. W. M. van Bakel, J. W. M. Jagt, & Friedrich Bachmayer. 2019. Paguroid anomurans from the Tithonian Ernstbrunn Limestone, Austria: The most diverse extinct paguroid assemblage in the world. *Annalen des Naturhistorischen Museums in Wien (series A)* 121:257–289.
- Frantescu, O. D., R. M. Feldmann, C. E. Schweitzer, Iuliana Lazăr, & Marius Stoica. 2018. New lobsters and lobster-like decapods (Crustacea) from the Jurassic and Cretaceous of Romania. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* 287:45–60.
- Garassino, Alessandro, Antonio De Angeli, & Giovanni Pasini. 2009. A new hermit crab (Crustacea, Anomura, Paguroidea) from the Late Cretaceous (Cenomanian) of Lebanon. *Atti della Società italiana di Scienze Naturali e del Museo civico di Storia naturale in Milano* 150(2):215–228.
- García-Gómez, Julio. 1994. The systematics of the genus *Anapagurus* Henderson, 1886, and a new genus for *Anapagurus drachi* Forest, 1966 (Crustacea: Decapoda: Paguridae). *Zoologische Verhandlungen Leiden* 295:1–131.
- Gašparič, Rok, R. H. B. Fraaije, Ninon Robin, & Antonio De Angeli. 2016. The first record of paguroids from the Eocene of Istria (Croatia) and further phylogenetic refinement of the Paguroidea (Crustacea, Anomura). *Bulletin of Geosciences* 91:467–480.
- Glaessner, M. F. 1929. Crustacea Decapoda. *In* F. J. Pompeckj, ed., *Fossilium catalogus 1: Animalium*. W. Junk, Berlin. (41):1–464.
- Glaessner, M. F. 1969. Decapoda. *In* R. C. Moore, ed., *Treatise on Invertebrate Paleontology, Part R, Arthropoda 4, Vol. 2*. The Geological Society of America & The University of Kansas Press. Boulder & Lawrence. p. 400–533, 626–628.
- Hall, Sally, & Sven Thatje. 2018. Evolution through cold and deep waters: The molecular phylogeny of the Lithodidae (Crustacea: Decapoda). *The Science of Nature* 105:19:1–15.
- Heller, Camil. 1861. *Beiträge zur Crustaceen-Fauna des rothen Meeres. Zweiter Theil. Sitzungsberichte der Mathematisch-Naturwissenschaftlichen Classe der Kaiserlichen Academie der Wissenschaften*, 44:241–295, pl. 1–3.
- Henderson, J. R. 1886. Higher Crustacea of the Firth of Clyde. XXXIV. The Decapod and Schizopod Crustacea of the Firth of Clyde. *Proceedings and Transactions of the Natural History of Glasgow (new series)* 1:315–353.
- Henderson, J. R. 1888. Report on the Anomura collected by H.M.S. Challenger during the years 1873–1876. Report on the Scientific Results of the Voyage of H.M.S. Challenger During the Years 1873–1876. *Zoology* 27 (69):i–xi, 1–221, pl. 1–21.
- Henderson, J. R. 1893. A contribution to Indian carcinology. *Transactions of the Linnean Society of London (Series 2)* *Zoology* 5:325–458, pl. 36–40.
- Herbst, J. F. W. 1782–1804. *Versuch Einer Naturgeschichte der Krabben und Krebse: Nebst Einer Systematischen Beschreibung Ihrer Verschiedenen Arten*. Vol. 1–3. G. A. Lange & J. C. Fuessly. Berlin & Zürich. Vol 1 (1782–1790): p. 1–274, pl. 1–21. Vol. 2 (1791–1796):1–225, pl. 22–46. Vol. 3 (1799–1804):1–66, pl. 47–50.
- Holthuis, L. B. 1962. Forty-seven genera of Decapoda (Crustacea); Proposed addition to the Official List. *Z.N. (S.)* 1499. *Bulletin of Zoological Nomenclature* 19(4):232–253.
- Holthuis, L. B. 2002. A few notes on the authors

- and dates of the names of Crustacea collected by the "Voyage au Pôle Sud et dans l'Océanie sur les Corvettes l'Astrolabe et la Zélée". *Crustaceana* 75 (3–4):413–422.
- Hombron, J. B., & H. Jacquinet. 1842–1854. Atlas, Crustacés. *In* Zoologie. Voyage au Pôle Sud et dans l'Océanie sur les crevettes l'Astrolabe et la Zélée; exécuté par ordre du Roi pendant les années 1837–1838–1839–1840, sous le commandement de M. J. Dumont-D'Urville, Capitaine de vaisseau. Gide et J. Baudry. Paris. pl. 1–9.
- Hyžný, Matúš, R. H. B. Fraaije, J. E. Martin, Vincent Perrier, & Raphaël Sarr. 2016. *Paracapsulapagurus poponguinensis*, a new hermit crab (Decapoda, Anomura, Paguroidea) from the Mastrichtian of Senegal. *Journal of Paleontology* 90:1133–1137.
- ICZN (International Commission on Zoological Nomenclature). 1957. Opinion 472. Addition to the Official List of Generic Names in Zoology of the generic name *Pagurus* Fabricius, 1775, with *Cancer bernhardus* Linnaeus, 1758, as type species (Class Crustacea, Order Decapoda). Opinions and Declarations rendered by the International Commission on Zoological Nomenclature 16(13):213–276.
- ICZN (International Commission on Zoological Nomenclature). 1958. Opinion 511. Validation under the Plenary Powers of the generic name *Maja* Lamarck, 1801 (Class Crustacea, Order Decapoda) and designation under the same Powers of a type species for that genus in harmony with established practice. Opinions and Declarations rendered by the International Commission on Zoological Nomenclature 18(15):257–272.
- Keiler, Jonas, Stefan Richter, & C. S. Wirkner. 2015. The anatomy of the king-crab *Hapalogaster mertensii* Brandt, 1850 (Anomura: Paguroidea: Hapalogastriidae): New insights into the evolutionary transformation of hermit crabs into king crabs. *Contributions to Zoology* 84(2):149–165.
- Klompaker, A. A., Pedro Artal, R. H. B. Fraaije, & J. W. M. Jagt. 2011. Revision of the family Gastrodoridae (Crustacea, Decapoda), with description of the first species from the Cretaceous. *Journal of Paleontology* 85:226–233.
- Lamarck, J. B. P. A. 1818. Histoire naturelle des Animaux sans Vertèbres, présentant les caractères généraux et particuliers de ces animaux, leur distribution, leurs classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent; précédées d'une Introduction offrant la détermination des caractères essentiels de l'Animal, sa distinction du végétal et des autres corps naturels, Enfin, l'Exposition des Principes Fondamentaux de la Zoologie. Vol. 5. Verdrière. Paris. 612 p.
- Latreille, P. A. 1802–1803. Histoire naturelle, générale et particulière, des Crustacés et des Insectes. F. Dufart. Paris. Vol. 3. 468 p.
- Latreille P. A. 1806. Genera Crustaceorum et Insectorum secundum Ordinem naturalem in Familiis disposita, Iconibus Exemplisque plurimis explicata. Tomus Primus. Apud Loenig Bibliopola & Parisiis et Argentorati. Paris and Strasbourg. 302 p.
- Latreille, P. A. 1810. Considérations générale sur l'Ordre naturel des Animaux composant les Classes des Crustacés, des Arachnides et des Insectes; avec un tableau Méthodique de leurs genres, disposés en familles. Paris. 444 p.
- Latreille, P. A. 1825. Entomologie, ou histoire naturelle des Crustacés, des Arachnides et des Insectes. *In* Genre de Crustacés. Encyclopédie méthodique. Histoire naturelle 10:1–832. Paris.
- Latreille, P. A. 1829. Le Règne Animal Distribué d'Après son Organisation, pour Servir de Base à l'Histoire Naturelle des Animaux et d'Introduction à l'Anatomie Comparée par M. Le Baron Cuvier. Nouvelle Édition, Revue et Augmentée. Vol. 4. Crustacés, Arachnides et Partie des Insectes. Chez Déterville & Chez Crochard. Paris. xxvii + 584 p.
- Leach, W. E. 1816 [imprint 1815]. A tabular view of the external characters of four classes of animal which Linne arranged under Insecta: with the distribution of the genera composing three of these classes into orders and c. and descriptions of several new genera and species. *Transactions of the Linnean Society of London* 11 (2):306–400, and 'Errata'. [Dated 1815, but published 24 January 1816.]
- Lemaitre, Rafael. 1989. Revision of the genus *Parapagurus* (Anomura: Paguroidea: Parapaguridae), including redescriptions of the western Atlantic species. *Zoologische Verhandelingen* 253:1–106.
- Lemaitre, Rafael. 1995. A review of hermit crabs of the genus *Xylopagurus* A. Milne-Edwards, 1880 (Crustacea: Decapoda: Paguridae), including descriptions of two new species. *Smithsonian Contributions to Zoology* 570:1–27.
- Lemaitre, Rafael. 1999. Crustacea Decapoda: A review of the species of the genus *Parapagurus* Smith, 1879 (Parapaguridae) from the Pacific and Indian Oceans. *In* Crosnier, A., ed., Résultats des Campagnes MUSORSTOM 20. Mémoires du Muséum national d'Histoire naturelle (série A) Zoologie 180:303–378.
- Lemaitre, Rafael, & Patsy McLaughlin. 1996. Revision of *Pylopagurus* and *Tomopagurus* (Crustacea: Decapoda: Paguridae), with the descriptions of new genera and species. Part V. *Anisopagurus* McLaughlin, *Manucomplanus* McLaughlin, and *Protoniopagurus* new genus. *Bulletin of Marine Science* 59:89–141.
- Lemaitre, Rafael, & Patsy McLaughlin. 2022. World Paguroidea & Lomisoidea Database. Paguroidea Latreille, 1802. Accessed through: World Register of Marine Species at: <https://www.marinespecies.org/aphia.php?p=taxdetails&cid=106687> on 2022-08-02.
- Lemaitre, Rafael, D. L. Rahayu, & Tomoyuki Komai. 2018. A revision of "blanket-hermit crabs" of the genus *Paguroopsis* Henderson, 1888, with the description of a new genus and five new species (Crustacea, Anomura, Diogenidae). *ZooKeys* 752:17–97.
- Lenz, Heinrich. 1901. Ergebnisse einer Reise nach dem Pacific (Schauinsland 1896–1897). Crustaceen. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere* 14(5):429–482, pl. 32.
- Linnaeus, Carolus von. 1758. *Systema Naturae per Regna tria Naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Laurentii Salvii. Holmiae (Stockholm).*

- (Edition 10) 1:1–824.
- Linnaeus, Carolus von. 1767. *Systema Naturae* per Regna tria Naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Laurentii Salvii. Holmiae (Stockholm). (Edition 12) 1(2):533–1327.
- Lórenthey, Emerich, & Karl Beurlen. 1929. Die fossilen Decapoden der Länder der Ungarischen Krone. *Geologica Hungarica, Palaeontologica* 3:1–421, 16 pl., 12 tables.
- MacDonald, J. D., R. B. Pike, & D. I. Williamson. 1957. Larvae of the British species of *Diogenes*, *Pagurus*, *Anapagurus* and *Lithodes* (Crustacea, Decapoda). *Proceedings of the Zoological Society of London* 128:209–257.
- McLaughlin, P. A. 1981. Revision of *Pylopagurus* and *Tomopagurus* (Crustacea: Decapoda: Paguridae), with the descriptions of new genera and species. *Bulletin of Marine Science* 31:1–30.
- McLaughlin, P. A. 1983a. A review of the phylogenetic position of the Lomidae (Crustacea: Decapoda: Anomola). *Journal of Crustacean Biology* 3:431–437.
- McLaughlin, P. A. 1983b. Hermit crabs: Are they really polyphyletic? *Journal of Crustacean Biology* 3:608–621.
- McLaughlin, P. A., & Jacques Forest. 1997. Crustacea Decapoda: *Diacanthurus* gen. nov., a new genus of hermit crabs (Paguridae) with both Recent and fossil representation, and the descriptions of two new species. *Mémoires du Muséum national d'Histoire naturelle* 176:235–259.
- McLaughlin, P. A., Tomoyuki Komai, Rafael Lemaitre, & D. L. Rahayu. 2010. Annotated checklist of anomuran decapod crustaceans of the world (exclusive of the Kiwaoida and Families Chirostyliida and Galatheida of the Galatheoidea) Part 1: Lithodoidea, Lomisoidea and Paguroidea. *Raffles Bulletin of Zoology (Supplement 23)*:5–107.
- McLaughlin, P. A., & Rafael Lemaitre. 2001a. Revision of *Pylopagurus* and *Tomopagurus* (Crustacea: Decapoda: Paguridae), with descriptions of new genera and species. Part VI. *Pylopagurus* A. Milne Edwards & Bouvier, 1891, *Haigia* McLaughlin, 1981, and *Pylopaguridium*, a new genus. *Proceedings of the Biological Society of Washington* 114:444–483.
- McLaughlin, P. A., & Rafael Lemaitre. 2001b. A new family for a new genus and new species of hermit crab of the superfamily Paguroidea (Decapoda, Anomura) and its phylogenetic implications. *Journal of Crustacean Biology* 21:1062–1076.
- McLaughlin, P. A., Rafael Lemaitre, & Ulf Sorhannus. 2007. Hermit crab phylogeny: A reappraisal and its “fall-out.” *Journal of Crustacean Biology* 27:97–115.
- Miers, E. J. 1876. *Catalogue of the stalk- and sessile-eyed Crustacea of New Zealand*. Colonial Museum and Geological Survey Department. London. 136 p., 3 pl.
- Miers, E. J. 1879. On a collection of Crustacea made by Capt. H.C. St. John, R.N., in the Korean and Japanese Seas. With an appendix by Capt. H.C. St. John. *Proceedings of the Zoological Society of London* 1879(1):18–61, pl. I–III.
- Milne Edwards, Alphonse. 1880. *Études préliminaires sur les Crustacés*, 1^{ère} partie. Reports on the Results of Dredging under the Supervision of Alexander Agassiz, in the Gulf of Mexico, and in the Caribbean Sea, 1877, '78, '79, by the U.S. Coast Guard Survey Steamer 'Blake', Lieutenant-Commander C. D. Sigbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding. VIII. *Bulletin of the Museum of Comparative Zoology, Harvard* 8(1):1–68, pl. 1–2.
- Milne Edwards, Alphonse, & E. L. Bouvier. 1893. XXXIII. Description des Crustacés de la famille des Paguriens recueillis pendant l'Expédition. *Memoirs of the Museum of Comparative Zoology at Harvard College* 14(8):1–172, 12 pl.
- Milne Edwards, Alphonse, & E. L. Bouvier. 1897. Observations sur le genre *Sympagurus*. *Campagnes scientifique de S. A. le Prince Albert I de Monaco, a bord de l'Hirondelle et de la Princesse Alice. Bulletin de la Société Zoologique de France* 22:131–136.
- Milne-Edwards, Henri. 1834–1840. *Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie, et la classification de ces animaux*. Fonderie de Fain (Vol. 1–2); Fain & Thunot (Vol. 3). Paris. Vol. 1 (1834):1–468; Vol. 2 (1837):1–532; Vol. 3 (1840):1–638; Atlas:1–32, pl. 1–42.
- Milne-Edwards, Henri. 1836. Observations zoologiques sur les Pagures et description d'un nouveau genre de la tribu des Paguriens. *Annales des Sciences Naturelles Zoologie, Paris (série 2)* 6:257–288.
- Milne-Edwards, Henri. 1848. Note sur quelques nouvelles espèces du genre Pagure. *Annales des Sciences Naturelles Zoologie, Paris (série 3)* 10:59–64.
- Milne-Edwards, Henri, & Hippolyte Lucas. 1841. Description des crustacés nouveaux ou peu connus conservés dans la collection du Muséum d'Histoire Naturelle. *Archives du Muséum d'Histoire Naturelle, Paris* 2:461–483, pl. 24–28.
- Miyake, Sadayoshi. 1978. *The crustacean Anomura of Sagami Bay*. Biological Laboratory Imperial Household, Hoikusha Publishing Company. Japan. 200 p., 4 pl.
- Molina, J. I. 1782. Saggio sulla storia naturale del Chile, del Signor Abate Giovanni Ignazio Molina. Bologna. iv + 306 p. + errata + map.
- Negri, Mariana, Rafael Lemaitre, & F. L. Mantelatto. 2014. Molecular and morphological resurrections of *Clibanarius symmetricus* (Randall, 1840), a cryptic species hiding under the name for the “thin stripe” hermit crab *C. vittatus* (Bosc, 1802) (Decapoda: Anomura: Diogenidae). *Journal of Crustacean Biology* 34:848–861.
- Neumann, Richard. 1878. *Systematische Uebersicht der Gattungen der Oxyrhynchen*. *Catalog der Podophthalmen Crustaceen des Heidelberger Museums. Beschreibung einiger neuer Arten*. Der Hohen philosophischen Facultät der Universität Heidelberg als Inauguraldissertation. J. B. Hirschfeld. Leipzig. 39 p.
- Noever, Chrisoph, & Henrik Glenner. 2018. The origin of king crabs: Hermit crab ancestry under the magnifying glass. *Zoological Journal of the Linnean Society* 182:300–318.
- Olivier, A. G. 1811–1812. *Histoire Naturelle. Insectes. In Encyclopédie Méthodique (Dictionnaire Encyclopédique Méthodique)*. Zoologie 8. Liège. Paris. 722 p.

- Ortmann, A. E. 1892. Die Dekapoden-Krebse des Strassburger Museums IV. Die Abtheilungen Galatheidea und Paguridea. Zoologischen Jahrbücher, (Systematik, Geographie und Biologie der Tiere) 6:241–326, pl. 11–12.
- Paul'son, Otton. 1875. Studies on the Crustacea of the Red Sea with notes regarding other seas. Part 1. Podophthalmata and Edriophthalmata (Cumacea). S. V. Kul'zhenko. Kiev. [Translation published for The National Science Foundation, Washington, D. C. and Smithsonian Institution, U.S.A., by the Israel Program for Scientific Translations, 1961.] p. 1–164, 21 pl.
- Pennant, Thomas. 1777. British Zoology, Vol. IV. Crustacea. Mollusca. Testacea. London. viii + 154 p., 93 pl.
- Pilgrim, R. L. C. 1965. Some features in the morphology of *Lomis hirta* (Lamarck) (Crustacea: Decapoda) and a discussion of its systematic position and phylogeny. Australian Journal of Zoology 13:545–557.
- Poore, G. C. B. 2004. Marine Decapod Crustacea of Southern Australia. A Guide to Identification. Museum Victoria. Melbourne. i–ix + 574 p.
- Poore, G. C. B., & S. T. Ah Yong. 2023. Marine Decapod Crustacea, a guide to families and genera of the world. CSIRO Publishing. Victoria. 916 p.
- Rahayu, D. L., & Jacques Forest. 1999. Sur le statut de *Calcinus gaimardii* (H. Milne Edwards, 1848) (Decapoda, Anomura, Diogenidae) et description de deux espèces nouvelles apparentées. Zoosystema 21(3):461–472.
- Samouelle, G. 1819. The Entomologist's Useful Compendium, or an Introduction to the British Insects, etc. T. Boys. London. 496 p.
- Schmitt, W. L. 1926. The macruran, anomuran, and stomatopod crustaceans collected by the American Museum Congo Expedition, 1909–1915. Bulletin of the American Museum of Natural History 53:1–67, pl. I–IX.
- Schweigert, Günter. 2006. The first cycloid arthropod from the Late Jurassic. Zitteliana (A) 46:85–89.
- Schweigert, Günter, René Fraaije, Philippe Havlik, & Alexander Nützel. 2013. New early Jurassic hermit crabs from Germany and France. Journal of Crustacean Biology 33:802–817.
- Schweitzer, C. E., R. M. Feldmann, & Iuliana Lazăr. 2009. Fossil Crustacea (excluding Cirripedia and Ostracoda) in the University of Bucharest Collections, Romania, including new species. Bulletin of the Mizunami Fossil Museum 35:1–14.
- Smith, S. I. 1879. The stalk-eyed crustaceans of the Atlantic Coast of North America north of Cape Cod. Transactions of the Connecticut Academy of Arts and Sciences 5(1):27–136, pl. VIII–XII.
- Smith, S. I., 1882. XVII. Report on the Crustacea. Part I. Decapoda. Reports on the results of dredging, under the supervision of Alexander Agassiz, on the east coast of the United States, during the summer of 1880, by the U.S. Coast Survey Steamer "Blake", Commander J. R. Bartlett, U.S.N. commanding. Bulletin of the Museum of Comparative Zoology at Harvard College 10(1880):1–108.
- Stebbing, T. R. R. 1914. South African Crustacea. Part VII. Annals of the South African Museum 15:1–55, pl. LXX–LXXVI.
- Stimpson, William. 1858. Prodromus descriptionis animalium evertibratorum, quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers ducibus, observavit et descripsit. Pars VII. Crustacea Anomura. Proceedings of the Academy of Natural Sciences of Philadelphia 10:225–252. [Pages 63–90 on separate.]
- Thompson, E. F. 1930. Contributions for a revision of the New Zealand Crustacea of the family Paguridae. Records of the Canterbury Museum 3(4):263–273, pl. XLI.
- Tilesius, W. G. 1815. De cancris Camtschaticis, oniscis, entomostracis et cancellis marinis microscopicis noctilucentibus, Cum tabulis IV. Aeneis et appendice adnexo de acaris et ricinis Camtschaticis. Mémoires de l'Académie Impériale des Sciences de St. Pétersbourg 5(2):331–405, pl. 5–8.
- Tudge, C. C., Akira Asakura, & S. T. Ah Yong. 2012. Infraorder Anomura MacLeay, 1838. In F. R. Schram & J. C. von Vaupel Klein, eds., The Crustacea, Volume 9, Part B, Eucarida: Decapoda: Astacidea P. P. (Enoplometoidea, Nephropoidea), Glypheidea, Axiidea, Gebiidea, and Anomura. Brill. Leiden. p. 221–333.
- Van Straelen, Victor. 1925. Contribution à l'étude des Crustacés Décapodes de la période jurassique. Mémoires d'Académie Royale de Belgique, Science (série 2) 4(7):1–462, pl. 1–10.
- Vía Boada, Luis. 1959. Decápodos fósiles del Eoceno español. Boletín del Instituto Geológico y Minero de España 70:1–72.
- Von Meyer, Herman. 1864. Briefliche Mitteilungen. In Neues Jahrbuch für Mineralogie, Geologie, Geologie, und Palaeontologie. C. F. Winter. Stuttgart. p. 206–211.
- White, Adam. 1856. Some remarks on Crustacea of the genus *Lithodes*, with a brief description of a species apparently hitherto unrecorded. Proceedings of the Zoological Society of London 24:132–135, pl. 42.
- WoRMS. (World Register of Marine Species). See DecaNet.