

Notes on the Distribution of Two Lithodid Crabs (Crustacea: Decapoda: Anomura) from off the Coast of Baja California Sur, México

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Abstract.—Surveys designed to investigate species of potential fisheries interest off the coast of Baja California Sur, México, have revealed the presence of two lithodid crabs (Crustacea, Decapoda, Anomura). One species, *Lithodes couesi* Benedict, 1895, is represented in the collections by 22 individuals and is reported from México for the first time, extending the known range of the species southward from off San Diego, California. The second species, *Glyptolithodes cristatipes* (Faxon, 1893), has been reported previously from mostly more southern localities (Perú and Chile), and is represented by a single adult male. Remarks on a heavy infestation of a sacculinid parasite of *L. couesi* and on morphological changes during ontogeny in *G. cristatipes* are included.

The anomuran crab genus *Lithodes* includes 18 species in the Pacific (Macpherson 1991), 16 of which are known to occur in the eastern Pacific. Eight of these species occur in the northern hemisphere, including *Lithodes couesi* Benedict, 1895 (Wicksten 1989). Hendrickx (1993) reported only 6 species for the Mexican Pacific, all distributed off the coasts of the Baja California Peninsula, but did not include *L. couesi*, the southern-most record of which was San Diego, California, prior to this report (Schmitt 1921; Wicksten 1989). The monotypic genus *Glyptolithodes*, containing only *Glyptolithodes cristatipes* Faxon, 1893, has been reported from this region previously (see Hendrickx 1993). However, *G. cristatipes* apparently is rare, being predominantly a more southern species, although records exist for southern California: off the Palos Verdes Peninsula, Santa Catalina Island, and Coronado Bank (Wicksten 1982) and from the La Jolla and Redondo Submarine Canyons (see Materials examined under *G. cristatipes*). In this paper we document the occurrence of both species off the coast of Baja California Sur, México, and include natural history observations of both species.

Materials and Methods

Specimens of both species were collected during a preliminary survey of the crustaceans of potential fishery interest off the coast of Baja California Sur, by personnel of the Universidad Autonoma de Baja California Sur (UABCS) aboard the R/V "El Puma" during 1995. A total of 22 *Lithodes couesi* and one *Glyptolithodes cristatipes* were collected on May 21, 1995, on PUMA Cruise 9505, by baited traps lowered to different depths (see Material examined). All specimens were sexed, weighed, and preserved in a 4% formaldehyde solution at the

UABCS, and later transferred to 70% ethanol. Measurements (carapace width, carapace length) were obtained using vernier calipers. Two specimens of *L. couesi* (LACM 95-94.2) and the single specimen of *G. cristatipes* (LACM 95-94.1) are housed in the Crustacea collections of the Natural History Museum of Los Angeles County (LACM). All other specimens are housed at the UABCS. Two additional specimens of *G. cristatipes* from off southern California were borrowed from the Marine Biological Laboratory of the Los Angeles County Sanitation District through the kindness of Don Cadien.

Lithodes couesi Benedict, 1895

Fig. 1

Lithodes couesi Benedict, 1895: 481; Bouvier 1895: 10, 11, 28; Rathbun 1910: 166; Schmitt 1921: 162, pl. 28–29, figs. 3–5; Makarov 1939: 255, fig. 101; Sakai 1971: 13–14, pl. V, XIII; Hart 1971: 1543, 1982: 63, 94; Somerton 1981: 259; Wicksten 1982: 245, 1989: 303, 314; Dawson and Yaldwyn 1985: 101, fig. 18; Dawson 1989: 317.

Previous records.—Japan: off Onahama, and Hokkaido, depth unrecorded (Sakai 1971). Bering Sea: north of Unalaska and off Shumagin Bank, 399 and 625 fms (1125 m) (Benedict 1895); 58°N, 600–1400 m (Bouvier 1896); Bering Sea to off San Diego, 301 to 530 fms (542–954 m) (Schmitt 1921). Alaska: central Gulf of Alaska, on seamounts (Somerton 1981). British Columbia: Dixon Entrance, 54°32'00"N, 132°05.3'W, 258 m (Hart 1971); Queen Charlotte Islands, 53°00.8'N, 132°55.8'W, 1076 m (Hart 1971); west of Vancouver Island, Tasu Sound, Englefield Bay (Hart 1982). Southern California: southern islands and banks, 500–1000 m and 1000+ m (Wicksten 1982); off San Diego (Wicksten 1989).

Material examined.—PUMA Cruise 9505, Station 3, May 21, 1995, 27°22'29"N, 115°00'28"W, south of Bahia Tortugas, Baja California Sur, México, 740 m; 16 females, carapace width 92 mm to 123 mm (average 104.5 mm), carapace length 95 mm to 127 mm (average 111.2 mm); 6 males, carapace width 89 mm to 126 mm (average 106.6 mm), carapace length 85 mm to 129 mm (average 109.6 mm).

Distribution.—from off Onahama, Japan (Sakai 1971), to Bering Sea and Alaska, to south of Bahia Tortugas, Baja California Sur, México (this report), 258 to 1829 m.

Remarks.—There have been few additional distributional records of this species since its original description. The most southern limit recorded prior to this study was off San Diego (see Wicksten 1989). Our collections constitute a new distributional record of the species in México, and the most southern limit of the species in the Pacific, extending the known range approximately 640 km southward. The lack of any records of this species among those of deep water decapods of this region may be an artifact of sampling; Somerton (1981) remarked that "benthic sampling surveys infrequently reach the depth inhabited by *L. couesi*."

Although identification of our specimens as *L. couesi* was relatively easy, the species exhibits some morphological variation that has not, to our knowledge, been reported previously. The rostral length and to a lesser degree its shape can

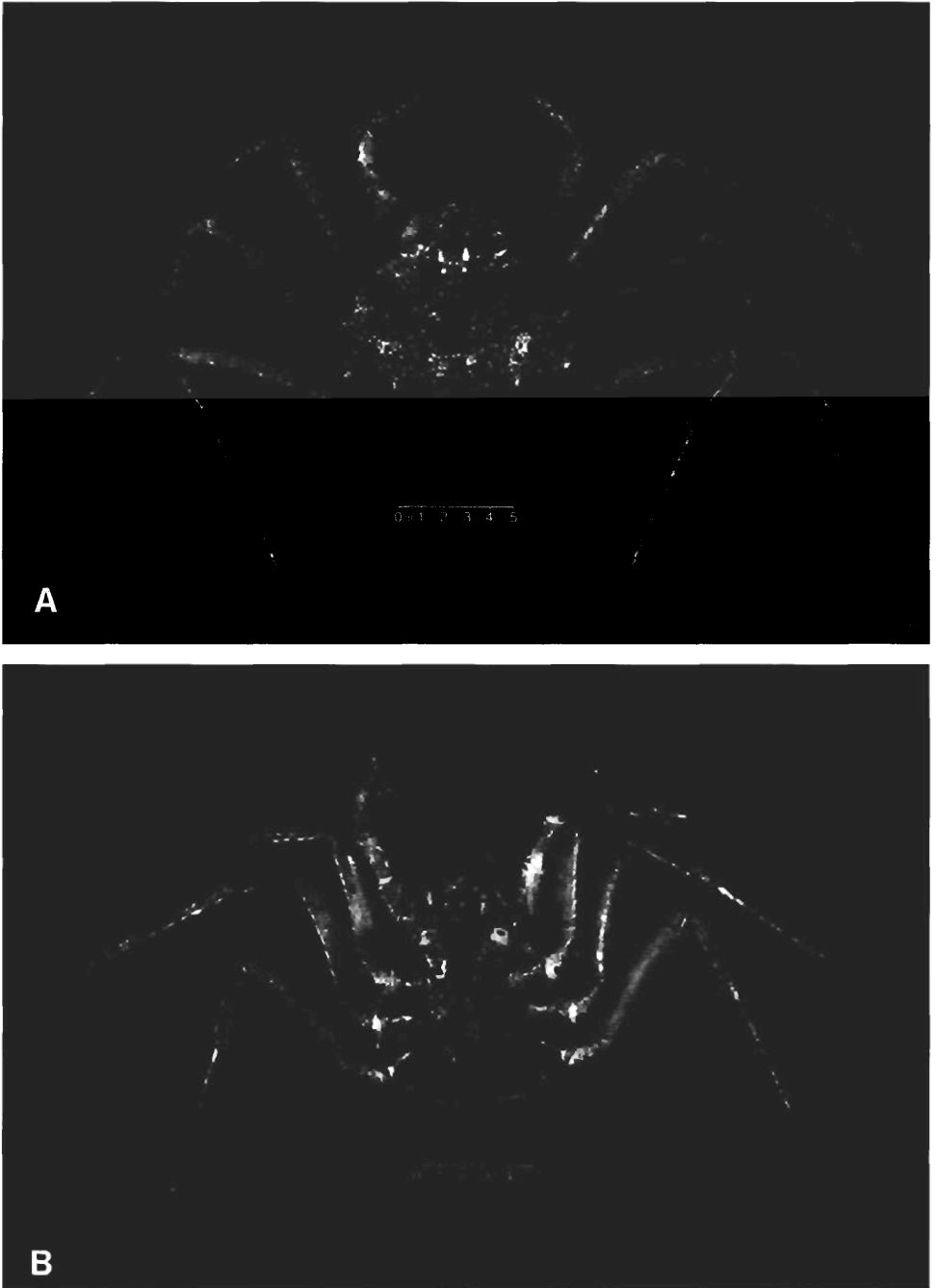


Fig. 1. *Lithodes couesi* Benedict from off Baja California Sur, México, adult male. A, dorsal view, B, ventral view.

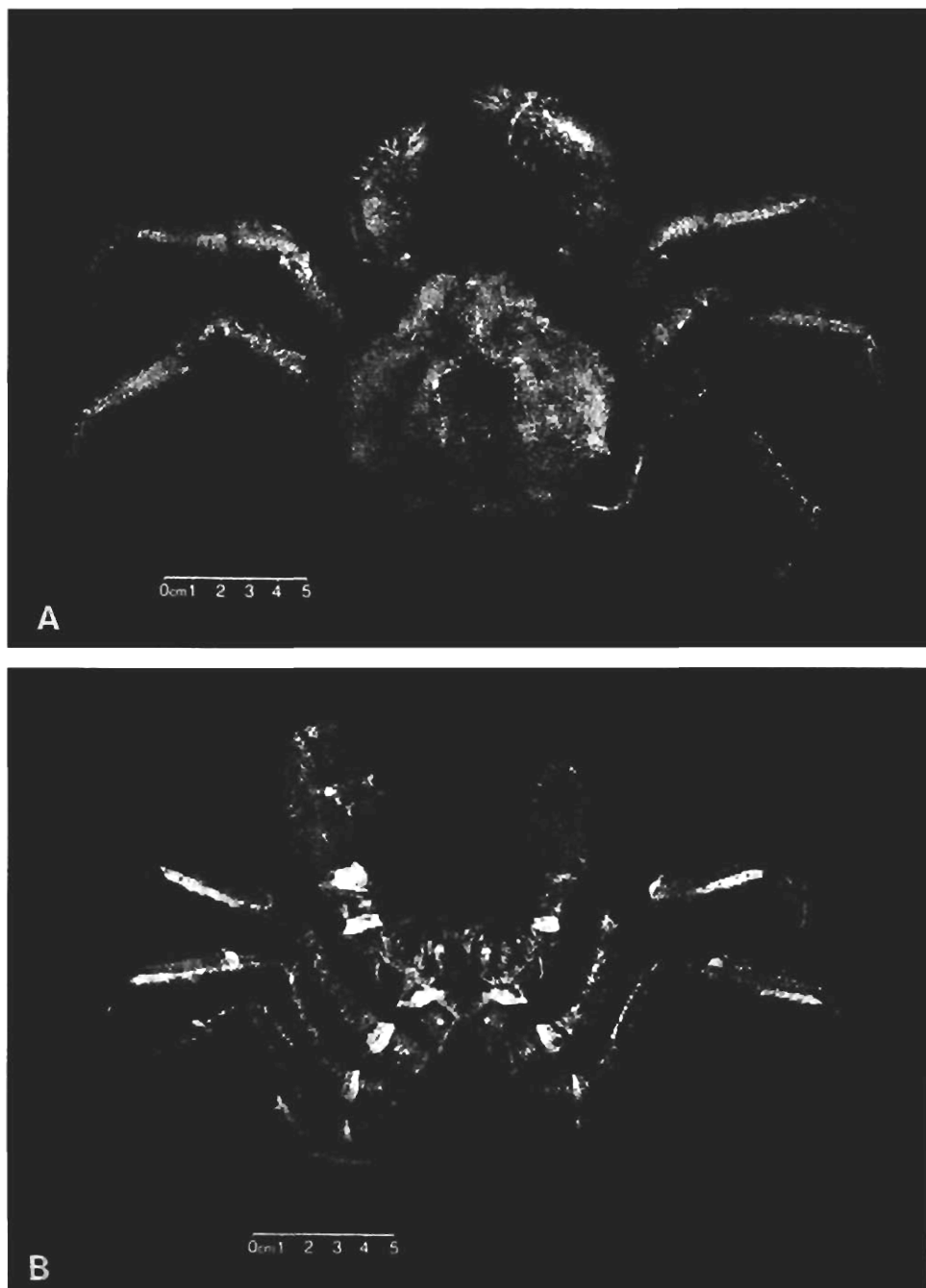


Fig. 2. *Glyptolithodes cristatipes* (Faxon) from off Baja California Sur, México, adult male. A, dorsal view, B, ventral view.

vary appreciably. Similarly, the characteristic lateral spines of the carapace can also vary, being longer and more acute in some specimens than in others.

Our collections showed heavy infestation by what we assume is the rhizocephalan barnacle *Briarosaccus callosus* Boschma, 1962. This species has been reported to parasitize *L. couesi* previously (Boschma 1970; Somerton 1981; Hawkes et al. 1985). However, this is the first report of this association in Mexican waters (because it is the first record of the host). More important perhaps is the very high incidence of parasitism. In the only study of the life history of *L. couesi*, Somerton (1981) reported an incidence of parasitism by *B. callosus* of only 0.7% in a collection of 674 individual *L. couesi*. Our collections differ dramatically in that, while only 22 specimens were collected, nearly 55% (12), all females, were parasitized. We found no parasitized males.

Although the date of publication stamped on the page headings of Benedict's paper is 1894, the volume appears to have been published later, in 1895, and that year appears on the cover of bound editions of the entire volume. Additionally, in original versions of the entire volume, the title of Benedict's paper in the Table of Contents is followed by a publication date of January 29, 1895. According to the ICZN rules of nomenclature (ICZN 1985:43, Article 21(d) and Recommendation 21F), the 1895 date must be upheld.

Glyptolithodes cristatipes (Faxon, 1893)

Figs. 2, 3

Rhinolithodes cristatipes Faxon 1893: 163; Faxon 1895: pl. 7, figs. 2, 2a-c; Bouvier 1896: 28.

Glyptolithodes cristatipes.—Faxon 1895: 43; del Solar 1972: 13; Haig 1974: 161, 162; del Solar 1981: 4, 5; Wicksten 1982: 245, 247; Andrade 1987: 80; Macpherson 1988: 23, fig. 9; Dawson 1989: 317; Wicksten 1989: 303, 304, 306, 314; Hendrickx 1993: 283, 309.

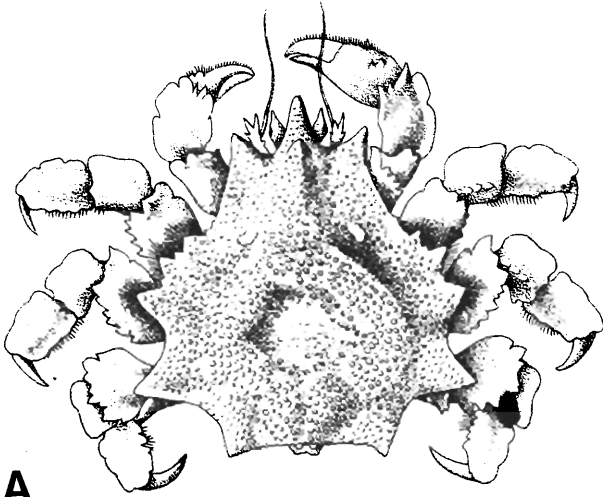
Glyptolithodes cristatipes.—Dawson and Yaldwyn 1985: 100 (typographical error), fig. 48.

Rhinolithodes (Glyptolithodes) cristatipes.—Bahamonde 1967: 3, pl. 1.

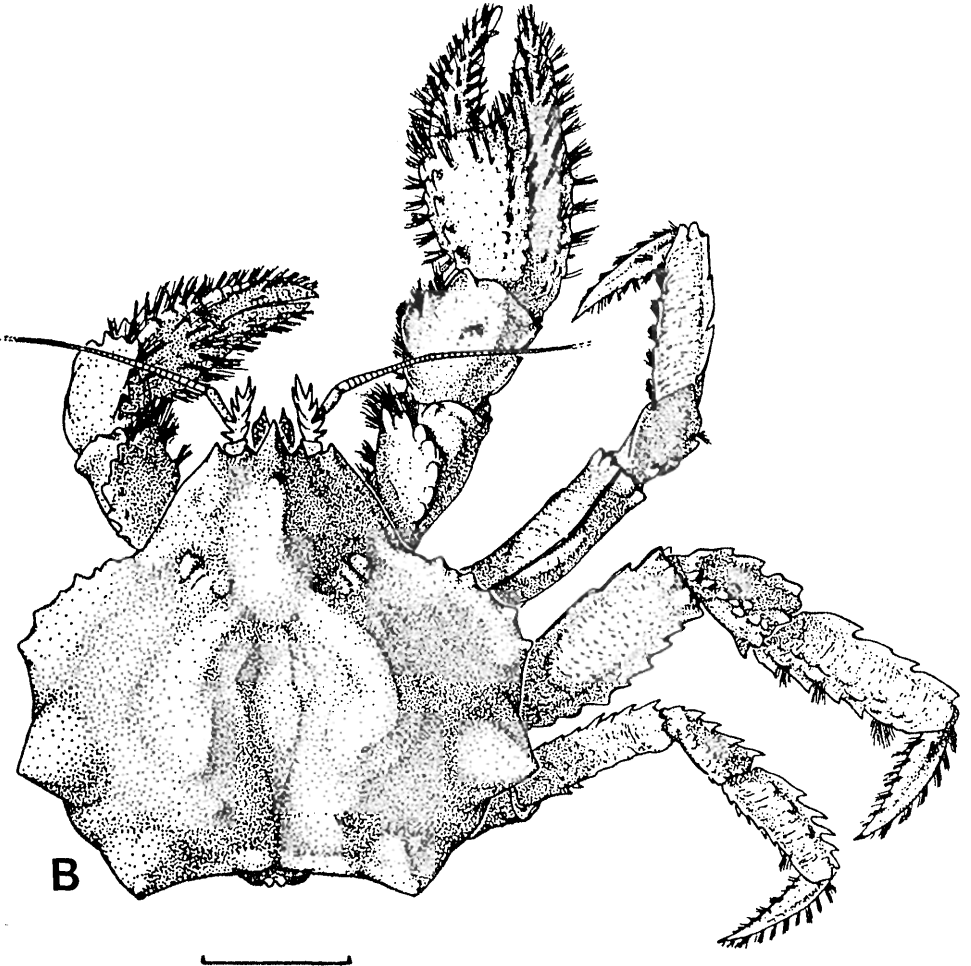
Previous records.—Panama: off Mariato Point, 07°09'45"N, 80°50'W, 322 fms (594 m) (Faxon 1893, 1895). Perú: south of Banco de Mancora, 400 m (del Solar 1972); off northern Perú, 03°51'S, 81°18'W, 800 m (del Solar 1972); off Puerto Chicama, 07°42'S, 80°26'W, 693 m (del Solar 1972); off Taltal, 25°11'S, 70°31'W, 245–266 m (Bahamonde 1967); at 06°31.5'S, 81°01.5'W, 712–744 m (Haig 1974). Chile: off Iquique, Chile, depth not recorded (Bahamonde 1967); off Coquimbo, Los Vilos, Pichidangui, Papudo, and Quintero, Chile, 29°58'S to 32°42'S, 250–480 m (Andrade 1987). California: off east end of Santa Catalina Island, 702 m; off Palos Verdes Peninsula, 33°33.5'N, 118°15.7'42"W, 462 m; and from Coronado Bank, 183 m (Wicksten 1982); off Palos Verdes Peninsula, south slope of Redondo Submarine Canyon, California, 33°49.08'N, 118°27.09'W (trawl mid-

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Fig. 3. Changes in carapace shape and pereopod length and width in developing *Glyptolithodes cristatipes* (Faxon). A, juvenile (from Faxon 1895). B, older male specimen (from Haig 1974). Compare B to photograph in Fig. 2A, a larger adult with less evidence of spination on carapace borders.



A



B

point), 305 m, station TO-1000, 21 Aug 1992 (County Sanitation Districts of Los Angeles County collections; D. Cadien, pers. comm.). México: west coast of Baja California Peninsula as far south as Bahía Magdalena; on the mainland from Cabo Corrientes south to the Mexican–Guatemalan border (extrapolated; no specimens known from that region) (Hendrickx 1993).

Material examined.—PUMA Cruise 9505, Station 3, May 21, 1995, 27°22'29"N, 115°00'28"W, south of Bahía Tortugas, Baja California Sur, México, 740 m; 1 male, carapace width 97.4 mm (measured at the widest point, which is at the last of a series of spines on the lateral carapace margin), carapace length 89.9 mm (including rostrum). Off Palos Verdes Peninsula, south slope of Redondo Submarine Canyon, California, 33°49.08'N, 118°27.09'W (trawl midpoint), 305 m, station TO-1000, 21 Aug 1992; 1 female, carapace width 63.5 mm, carapace length 61.9 mm (collection of the Marine Biology Laboratory, Los Angeles County Sanitation District). La Jolla Submarine Canyon, ROV dive no. 160, 550 m, 28 Oct 1995, 1 male, carapace width 64.3 mm, carapace length 63.8 mm (voucher collection for deep-sea videotapes at Scripps Institution of Oceanography, La Jolla, California).

Distribution.—From Palos Verdes Peninsula, California, USA (Wicksten 1982 and this report), to Quintero, Chile (Andrade 1987), 183–800 m.

Remarks.—Adults and juveniles show many differences, some of which were pointed out by Haig (1974). These differences include the following: “The carapace is broader than long instead of about as long as broad; the setae which decorate its lateral prominences in juveniles are absent in adults. There are three or four spines, instead of two, on each antennal acicle. The walking legs are much longer than the carapace width, and the various articles of these legs are proportionately more elongate than they are in juveniles” (from Haig 1974). In fact, even Haig’s specimen appears to be less mature than our single male, prompting us to offer the following comparison to facilitate identification of this species at various stages. The overall spination appears to decrease in size as the crabs age, with older individuals (Fig. 2) appearing nearly circular in carapace outline as compared to younger specimens (Figs. 3A, B). (A decrease in spination with ontogeny appears to be true for lithodids in general, and is particularly obvious in some species, such as *Lithodes panamensis* Faxon; e.g., see del Solar 1981: 9.) The relative length of the appendages increases with age, resulting in an adult that is more “spider-like” than the rather short and stout juvenile. Indeed, were it not for the fact that virtually no other deep sea decapod in this region is remotely similar to either adults or juveniles of *G. cristatipes*, we would still be somewhat hesitant to assign juveniles and adults to the same species.

In the original description, the specimen was placed in the genus *Rhinolithodes* (Faxon 1893). Because he “had seen neither specimen nor figure of the type of this genus” he later (Faxon 1895) removed it to a separate genus, *Glyptolithodes*, once it became clear to him that *Rhinolithodes* was morphologically quite different. Bouvier was apparently unaware of this development when he wrote his 1896 paper.

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Literature Cited

- Andrade, H. 1987. Distribución batimétrica y geográfica de macroinvertebrados del talud continental de Chile central. *Cienc. y Tec. del Mar, CONA*, 11:61-94.
- Bahamonde, N. 1967. *Rhinolithodes (Glyptolithodes) cristatipes* Faxon frente a la costa Chilena (Crustacea, Decapoda, Anomura, Lithodidae). *Not. Mens. Mus. Nac. Hist. Nat.*, Santiago, 136: 3-7.
- Benedict, J. 1895. Scientific results of explorations by the U.S. Fish Commission Steamer "Albatross." XXXI. Descriptions of new genera and species of crabs of the family Lithodidae, with notes on the young of *Lithodes camtschaticus* and *Lithodes brevipes*. *Proc. U.S. Natl. Mus.*, 17:479-488.
- Boschma, H. 1962. Rhizocephala. *Discovery Reports, Nat. Inst. Oceanogr.*, 33:55-94.
- . 1970. Notes on Rhizocephala of the genus *Briarosaccus* with the description of a new species. *Proc. Sect. Sci., Koninklijke Nederlandse Akad. van Wetensch. te Amsterdam, Ser. C, Biol. and Med. Sciences* 73:233-242, text-figs. 1-6, pl. J.
- Bouvier, E. 1896. Sur la classification des Lithodines et sur leur distribution dans les océans. *Annl. Sci. Nat. Zool.*, (8)I(1):1-46.
- Dawson, E. W. 1989. King crabs of the world (Crustacea: Lithodidae) and their fisheries. A comprehensive bibliography. *New Zeal. Oceanogr. Inst., Div. Water Sci., DSIR, Wellington, Misc. Publ.* 101. 338 pp.
- Dawson, E. W., and J. C. Yaldwyn. 1985. King crabs of the world or the world of king crabs: an overview of identity and distribution—with illustrated diagnostic keys to the genera of the Lithodidae and to the species of *Lithodes*. *Proc. Int. King Crab Symp., Anchorage, Alaska*, 1985:69-106.
- del Solar, E. 1972. Addenda al Catálogo de Crustáceos del Perú. *Instit. Mar. del Perú Infor.*, 38:1-21.
- . 1981. Lithodidae, nueva familia de cangrejos gigantes en el Perú. *Bol. de Lima*, 14:1-16 (68-81).
- Faxon, W. 1893. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California . . . by the U.S. Fish Commission steamer "Albatross" during 1891. VI. Preliminary observations of new species of Crustacea. *Bull. Mus. Comp. Zool., Harvard College*, 24:149-220.
- . 1895. Reports on an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands . . . by the U.S. Commission steamer "Albatross" . . . XV. The stalk-eyed Crustacea. *Mem. Mus. Comp. Zool., Harvard College*, 18:1-292, pls. A-K, I-LVII.
- Haig, J. 1974. Observations on the lithodid crabs of Peru, with description of two new species. *Bull. S. Calif. Acad. Sci.*, 73:152-164.
- Hart, J. F. L. 1971. New distribution records of reptant decapod Crustacea, including descriptions of three new species of *Pagurus*, from the waters adjacent to British Columbia. *J. Fish. Res. Board Canada*, 28:1527-1544, 22 figs.
- . 1982. Crabs and their relatives of British Columbia. *British Columbia Provincial Museum, Handbook No. 40*, iii + 266 pages.
- Hawkes, C., T. Meyers, and C. Shirley. 1985. The prevalence of the rhizocephalan *Briarosaccus callosus* Boschma, a parasite in blue king crabs, *Paralithodes platypus* (Brandt), of southeastern Alaska. Pp. 353-363 in *Proc. Int. King Crab Symp., Anchorage, Alaska*.
- Hendrickx, M. 1993. Crustáceos Decápodos del Pacífico Mexicano. Pp. 271-318 in *Biodiversidad marina y Costera de México. Com. Nal. Biodiversidad y CIQRO*.
- Macpherson, E. 1988. Revision of the family Lithodidae Samouelle, 1819 (Crustacea, Decapoda, Anomura) in the Atlantic Ocean. *Monogr. Zool. Mar.*, 2:9-53, figs. 1-53, pls. 1-28.

- . 1991. A new species of the genus *Lithodes* (Crustacea, Decapoda, Lithodidae) from French Polynesia. *Bull. Mus. Natl. Hist. Nat., Paris*, 4 ser., 13:153–158.
- Makarov, V. 1939. Fauna of U.S.S.R. Crustacea, vol. 10, no. 3. Anomura. *Zool. Inst. Acad. Sci. U.S.S.R., new series*, 16:xx + 1–324, figs. 1–113, pls. 1–5. [Translated and published for the National Science Foundation by the Israel Program for Scientific Translations, 1962.]
- Rathbun, M. J. 1910. Decapod crustaceans of the northwest coast of North America. *In* Harriman Alaska series, vol. X, crustaceans. (M. J. Rathbun, H. Richardson, S. J. Holmes, and L. J. Cole, eds.), Smithsonian Institution, Washington, D.C. [originally issued in 1904 by Doubleday, Page, & Co., New York].
- Sakai, N. 1971. Illustrations of 15 species of crabs of the family Lithodidae, two of which are new to science. *Res. Crustacea* (Carcinological Society of Japan), 4–5:1–49.
- Schmitt, W. 1921. The marine decapod Crustacea of California with special reference to the decapod Crustacea collected by the United States Bureau of Fisheries steamer "Albatross" in connection with the biological survey of San Francisco Bay during the years 1912–1913. *Univ. of Calif. Publ. in Zool.*, 23:1–470, text figs. 1–165, pls. 1–50.
- Somerton, D. 1981. Contribution to the life history of the deep-sea king crab, *Lithodes couesi*, in the Gulf of Alaska. *Fish. Bull.*, 79:259–269.
- Wicksten, M. 1982. Crustaceans from baited traps and gill nets off southern California. *Calif. Fish and Game*, 68:244–248.
- . 1989. Ranges of offshore decapod crustaceans in the eastern Pacific Ocean. *Trans. San Diego Soc. Nat. Hist.*, 21:291–316.

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