

A new species of *Pagurus* Fabricius, 1775 from the Pacific coast of Colombia, with a checklist of eastern Pacific species of the genus

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Abstract

A new species of hermit crab of the family Paguridae, *Pagurus meloi*, is described from the Pacific coast of Colombia, the fifth species of *Pagurus* Fabricius known to occur along this tropical coastline. This new species is immediately distinguished from other eastern Pacific congeners primarily by the numerous tufts or short rows of setae on the chelipeds; second and third pereopods with dactyls lacking ventral spines or spinules, and fringed with long setae on dorsal margins of meri, carpi, propodi, and dactyls; and ocular acicles often lacking terminal or subterminal spines. Among the eastern Pacific species of *Pagurus*, this new species is morphologically most similar to *P. imarpe* Haig, and *P. delsolari* Haig, and among the western Atlantic species to *P. heblingi* Nucci and Melo, and *P. rotundimanus* Wass. However, *P. meloi* differs significantly from these other congeners, and cannot be assigned with certainty to any of the 11 informal groups of *Pagurus*. A checklist of all known eastern Pacific (Alaska to Chile) species of *Pagurus* along with general distributions and group assignment, is presented.

Key-words: Hermit crab, Paguridae, *Pagurus*, new species, checklist, eastern Pacific, Colombia.

Introduction

Recent expeditions to study the upper slope fauna of the northern portions of the Pacific coast of Colombia (Bahía Humboldt to Buenaventura) by research institutions from that country, have obtained numerous crustacean specimens. While studying the hermit crabs, a new species of the genus *Pagurus* Fabricius, 1775 was discovered. Among other distinguishing characters, this new species stands out from other congeners in the eastern Pacific because of the many tufts or short rows of setae on the dorsal surface of the chelipeds, the fringes of long setae on the meri, carpi, propodi and dactyls of second and third pereopods, and often the lack of spines on the ocular acicles. Only four species of *Pagurus* had been previously reported from the Pacific coast of Colombia (Lemaitre and Alvarez León, 1992). This new species, herein fully described and illustrated, cannot be clearly assigned to any of the 11 informal groups of *Pagurus* that have been proposed by various carcinologists (A. Milne-Edwards and Bouvier, 1892; Bouvier, 1940; MacDonald *et al.*, 1957; Forest and de Saint Laurent, 1968; Haig, 1974, 1977; McLaughlin, 1974, 1975; Forest, 1978; Lemaitre *et al.*, 1982; Ingle, 1985).

A number of authors have discussed or compiled lists of hermit crab species from various regions of the eastern Pacific (*e.g.* Schmitt, 1921; Glassell, 1937; Haig, 1955; Haig *et al.*, 1970; McLaughlin, 1974; Hart, 1982; Lemaitre and Alvarez León, 1992; Hendrickx and Harvey, 1999; Retamal and Jara, 2002). However, these have been geographically limited in scope, and a list of species from the entire eastern Pacific (Alaska to Chile) has never been published. As

result of a thorough search of the literature on eastern Pacific species of *Pagurus* conducted during this study, a complete list of species of this genus from this large region was obtained. With the addition of *P. meloi* n. sp., the eastern Pacific region now includes 52 species of *Pagurus*, or 30.9 % of the 168 Recent species currently assigned to this genus from the world.

Materials and Methods

Specimens were collected on board the oceanographic vessel ARC *Malpelo*, during a cruise from October 6 to 13, 2002, by personnel from the Instituto de Investigaciones Marinas y Costeras at Punta de Betín, Santa Marta, Colombia (INVEMAR), and the Colombian Navy's Dirección General Marítima (DIMAR). This cruise was part of a broad program known as "Macrofauna III", designed to investigate the upper slope fauna of the Pacific coast of Colombia. A 9 m-opening semi-balloon trawl net equipped with a cod-end having a 0.5 cm-mesh size net, was used. Type and other material of the new species are deposited in the collections of Museo de Historia Natural Marina de Colombia (INV CRU), with duplicates of non-types in the National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM). McLaughlin (1974) is followed for general terminology; Lemaitre (2004) for type and division of gill lamellae; and McLaughlin (1997) for the term "semichelate". The shield length (sl) was measured in millimeters (mm) from midpoint of rostral lobe to midpoint of posterior margin of the shield. The length of the ocular peduncle was obtained by measuring the total length of the ultimate peduncular segment, including the cornea (cf. Powar, 1969) on the lateral face of the peduncle. Abbreviations used are: ARC, Armada República de Colombia; sta., station; ov., ovigerous.

Taxonomic account

Pagurus meloi n. sp. (Figs. 1-3)

Type material: Pacific coast of Colombia. Holotype: male sl = 4.2 mm, sta. P15E5a, 04°49.2'N, 77°26.53'W, 67-65 m, 7 October 2002 (INV-CRU 4833). Paratypes: 1 male sl = 4.0 mm, sta. P3E17a, 06°32.15'N, 77°21.09'W, 74-80 m, 10 October 2002 (INV-CRU 4834); 1 ov. female sl = 4.2 mm, sta. P14E9a, 04°57.80'N, 77°28.79'W, 70 m, 8 October 2002 (INV-CRU 4835); 1 female sl = 3.8 mm, same data as holotype (INV-CRU 4836); 1 male sl = 2.2 mm, sta. P15E5b, 04°49.50'N, 77°26.73'W, 70-71 m, 7 October 2002 (INV-CRU 4837).

Non-paratypes: Pacific coast of Colombia: 5 males sl = 2.5-4.4 mm, 4 ov. females sl = 2.1-3.0 mm, sta. P3E17b, 06°33.80'N, 77°23.72'W, 152-146 m, 10 October 2002 (INV-CRU 4838); 2 males sl = 2.3, 2.4 mm, sta. P3E18b, 06°33.94'N, 77°23.73'W, 145-143 m, 10 October 2002 (INV-CRU 4839); 7 males sl = 2.1-4.9 mm, 2 females sl = 3.7, 4.0 mm, 17 ov. females sl = 1.7-4.2 mm, sta. P14E9a, 04°57.80'N, 77°28.79'W, 70 m, 8 October 2002 (INV-CRU 4840); 1 male sl = 3.6 mm, sta. P14E11A1, 05°02.25'N, 77°33.99'W, 272-295 m, 8 October 2002 (INV-CRU 4841); 6 males sl = 2.0-4.0 mm, 1 female sl = 3.5 mm, 3 ov. females sl = 2.3-3.2 mm, sta. P15E5a, 04°49.2'N, 77°26.53'W, 67-65 m, 7 October 2002 (USNM 1071038, ex INV-CRU 4842); 6 males 1.7-4.6 mm, 3 females sl = 2.2-2.3 mm, 1 ov. female sl = 3.8 mm, sta. P15E5b, 04°49.50'N, 77°26.73'W, 70-71 m, 7 October 2002 (USNM 1071039, ex INV-CRU 4843); 2 males sl = 3.5, 4.3 mm, sta. P15E6a, 04°49.13'N, 77°28.27'W, 128-119 m, 7 October 2002 (USNM 1071040, ex INV-CRU 4844); 1 male 3.7 mm, 1 ov. female sl = 2.6 mm, sta. P15E6b, 04°49.45'N, 77°28.90'W, 115-127 m, 7 October 2002 (INV-CRU 4845).

Nauplius

Description: Eleven pairs of biserial gills (Fig. 1a) weakly divided distally. Shield (Fig. 1b) broader than long; dorsal surface with scattered short setae; anterior margins between rostrum and lateral projections concave; anterolateral margins sloping; posterior margin truncate. Rostral lobe broadly rounded, reaching slightly beyond level of lateral projections. Lateral

projections subtriangular, terminating bluntly or with small spine.

Ocular peduncles short, about 0.6-0.7 times as long as shield; with few short setae dorsally. Corneas moderately dilated, width of each about 0.4-0.5 length of ocular peduncle. Ocular acicles bluntly subtriangular, weakly concave dorsally, often lacking terminal or subterminal spines; with few short setae dorsally and terminally; separated basally by about basal width of 1 acicle. Interocular lobe prominent, unarmed.

Antennular peduncles overreaching corneas by full length of ultimate segments. Ultimate segment with row of setae dorsally, and dorsodistal tuft of long setae. Penultimate segment with scattered setae. Basal segment with strong spine on laterodistal margin dorsally.

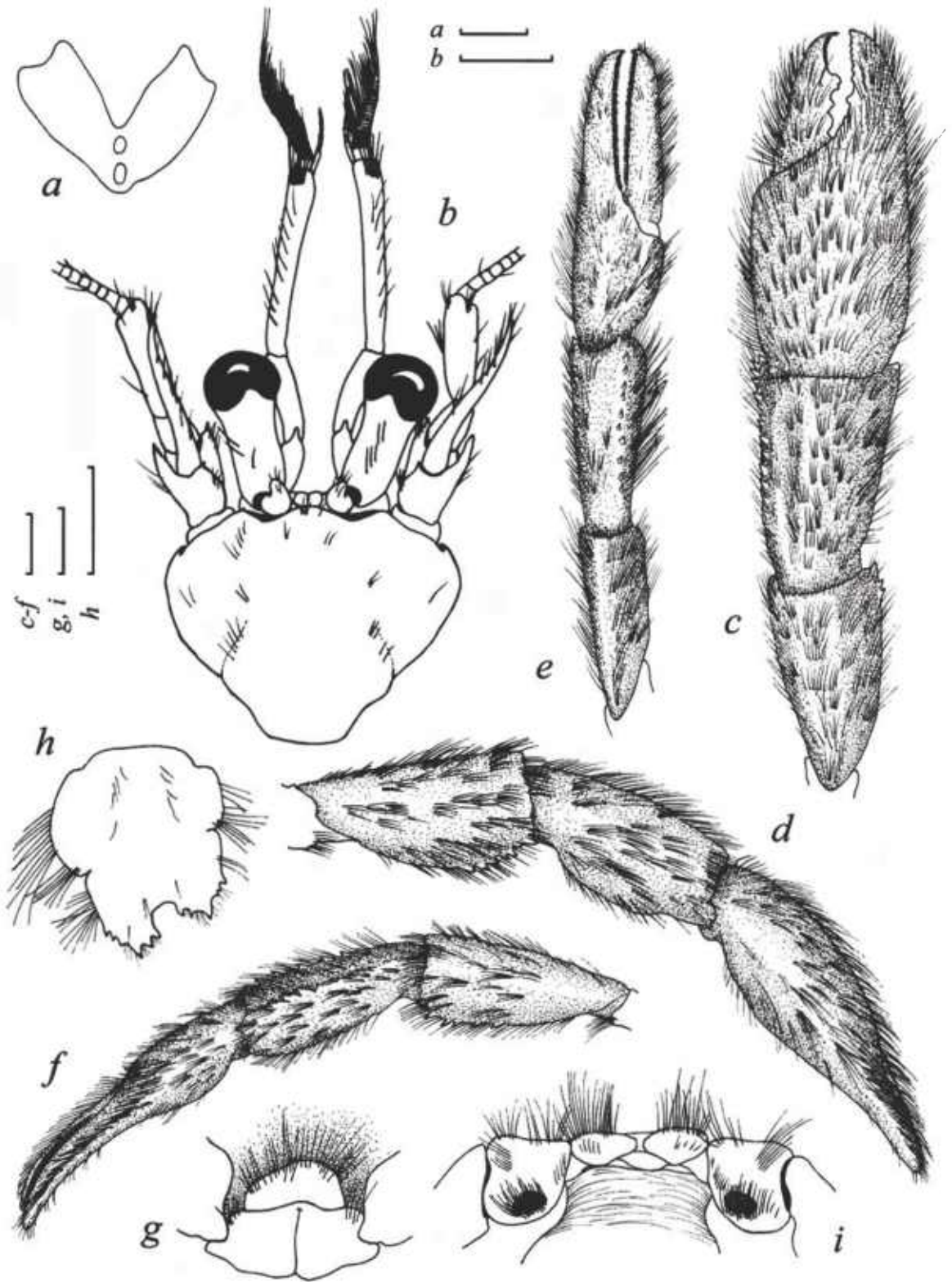
Antennal peduncles overreaching corneas by about 0.5 length of fifth segment; with supernumerary segment. Fifth segment with few setae on lateral and mesial margins. Fourth segment with scattered setae. Third segment with strong spine at ventrodistal angle. Second segment with dorsolateral distal angle prominently produced, reaching to about midpoint of fourth segment and terminating in strong spine; dorsomesial distal angle with small spine. First segment unarmed. Antennal acicle long, reaching nearly to distal margin of fifth antennal segment, sinuous, and terminating in strong spine; mesial margin sparsely setose, lacking spines. Flagellum long, well exceeding outstretched right cheliped; naked or with few short setae 1 or >1 flagellar article in length.

Mouthparts as figured (Fig. 2a-g). Mandible (Fig. 2a) with upper incisor edge with 3 low, rounded teeth, cutting edge with small corneous-tipped tooth at lower angle. Maxillule (Fig. 2b) with external lobe of endopod moderately developed, not recurved and with several long subdistal setae laterally; internal lobe with long terminal bristle. Third maxilliped (Fig. 2f, g) with crista dentata on ischium consisting of about 13 corneous-tipped teeth and 1 accessory tooth; merus with dorsodistal spine.

Chelipeds markedly unequal, elongate, left reaching to about midpoint of fingers of right. Right cheliped (Fig. 1c, d) with dorsal surfaces of merus, carpus and chela covered with numerous simple or plumose setae arranged in tufts or short transverse rows; ventral surface of chela sparsely setose. Fingers terminating in corneous claws crossed when closed. Dactyl shorter than length of palm, cutting edge with row of small corneous teeth dorsodistally, and prominent, unequal calcareous teeth proximally. Cutting edge of fixed finger with unequal calcareous teeth (larger proximally than distally). Palm convex dorsally, lacking spines; dorsolateral and dorsomesial margins rounded. Carpus about as long or slightly longer than length of palm; with dorsomesial row of spines. Merus usually with 1 or 2 small spines on dorsodistal margin; ventrodistal margin with row of spines. Ischium sparsely setose, usually with small spine on ventrolateral distal margin. Coxa with ventromesial row of setae.

Left cheliped (Fig. 1e, f) with setation pattern similar (except not as dense) to that of right cheliped. Fingers long, nearly twice as long as palm, slightly curved ventrally, terminating in corneous claws crossed when closed; cutting edges each with row of closely set small corneous spines, those of fixed finger interspersed with well spaced, small calcareous teeth. Palm convex dorsally, lacking spines; lateral and mesial margins rounded. Carpus with dorsomesial and dorsolateral rows of spines. Merus with row of spines on ventrodistal margin. Ischium with scattered setae, and ventromesial row of small spines. Coxa with ventromesial row of setae.

Second and third pereopods (Fig. 3a-d) with meri, carpi, propodi and dactyls each with distinct fringe of long setae on dorsal margin; lateral and mesial surfaces of segments glabrous. Dactyl slender, long, about 1.7 times as long as propodus, terminating in sharp corneous claw; with series of short, oblique rows of setae on ventromesial margin; ventral margin lacking spines or corneous spinules. Propodus lacking spines. Carpus with small dorsodistal spine. Merus lacking spines. Ischium and coxa with sparse setae. Anterior lobe of thoracic sternite XII (of third pereopods; Fig. 1g) roundly subrectangular, setose.



Nauplius

Figure 1: *Pagurus meloi* n. sp.: a, ov. female paratype sl = 4.2 mm, sta. P14E9a (INV-CRU 4835); b-i, male holotype sl = 4.2 mm, sta. P15E5a (INV-CRU 4833). a, gill lamella; b, shield and cephalic appendages, dorsal view; c, right cheliped, dorsal view; d, same, lateral view; e, left cheliped, dorsal view; f, same, lateral view; g, anterior lobe and posterior portion of thoracic sternite XII (third pereopods), ventral view; h, telson, dorsal view; i, thoracic sternite XIV and coxae of fifth pereopods, ventral view. Scales equal 0.25 mm (a), 1 mm (b, c-f), and 0.5 mm (g, i, h).

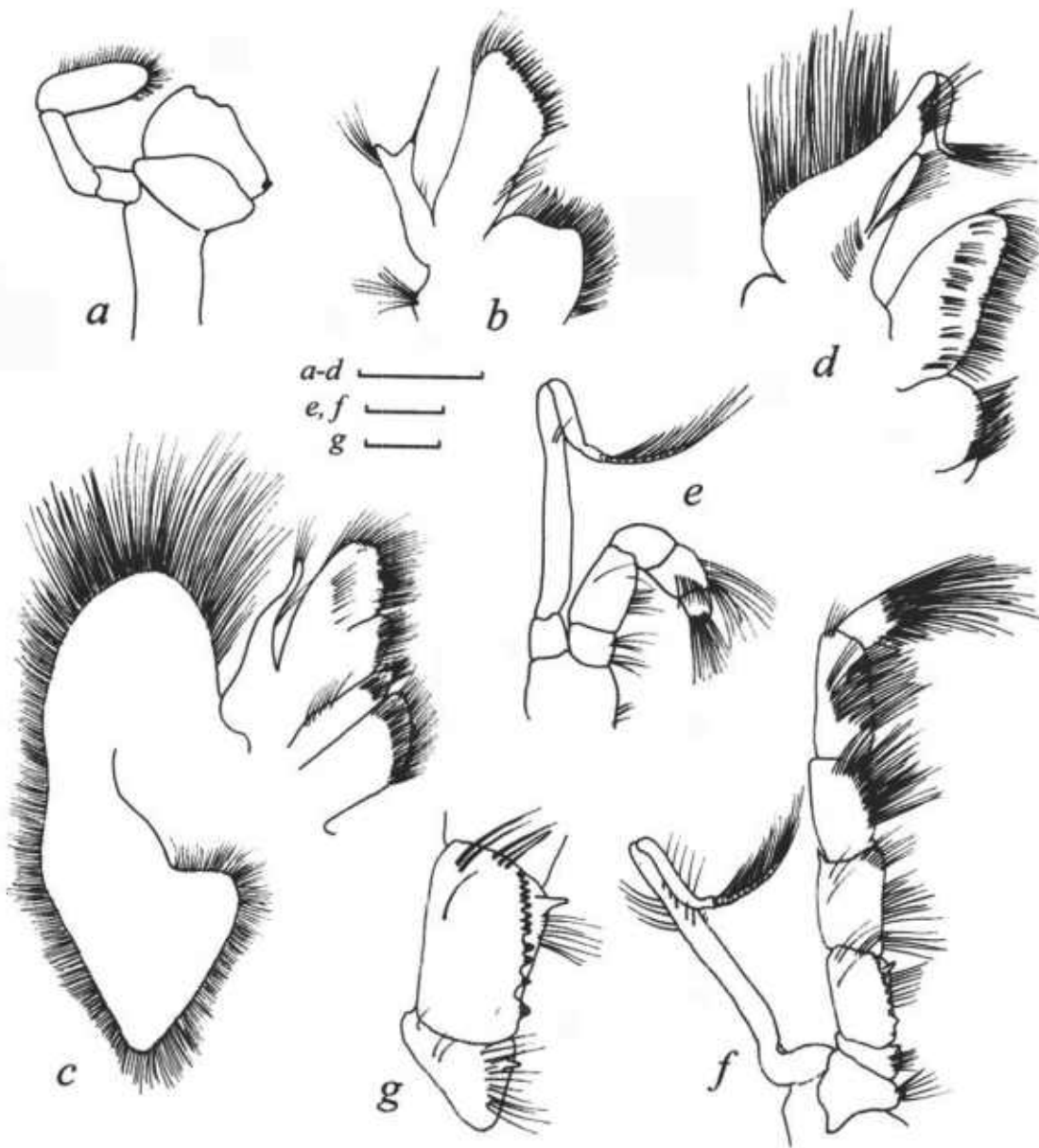


Figure 2: *Pagurus meloi* n. sp., ov. female paratype sl = 4.2 mm, sta. P14E9a (INV-CRU 4835). Left mouthparts, internal view: a, mandible; b, maxillule; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped; g, coxa and ischium of same. Scales equal 0.5 mm (a-d, e, f) and 0.25 mm (g).

Fourth pereopod (Fig. 3e, f) semichelate; dorsal margins of merus and carpus with long setae. Dactyl slightly curved, terminating in corneous claw; with ventrolateral row of closely set, small corneous spines. Propodal rasp with 1 row of ovate corneous scales.

Fifth pereopod (Fig. 3g) chelate. Dactyl with ventrolateral row of small ovate scales. Propodal rasp extending posteriorly to nearly midpoint of segment.

Uropods and telson asymmetrical. Telson (Fig. 1h) with transverse indentations, and scattered setae on dorsal surface; anterior lobes with long setae laterally; posterior lobes separated by deep U-shaped cleft, terminal margins slightly oblique, armed with strong corneous-tipped spines, lateral margins with few (usually 2-4) blunt or sharp corneous-tipped spines posteriorly.

Female with paired gonopores; with unpaired pleopods 2-5, pleopod 5 not ovigerous. Male with gonopores (Fig. 1i) partially covered by fringe of setae arising from or near posterior margins of gonopore openings; with unpaired pleopods 3-5.

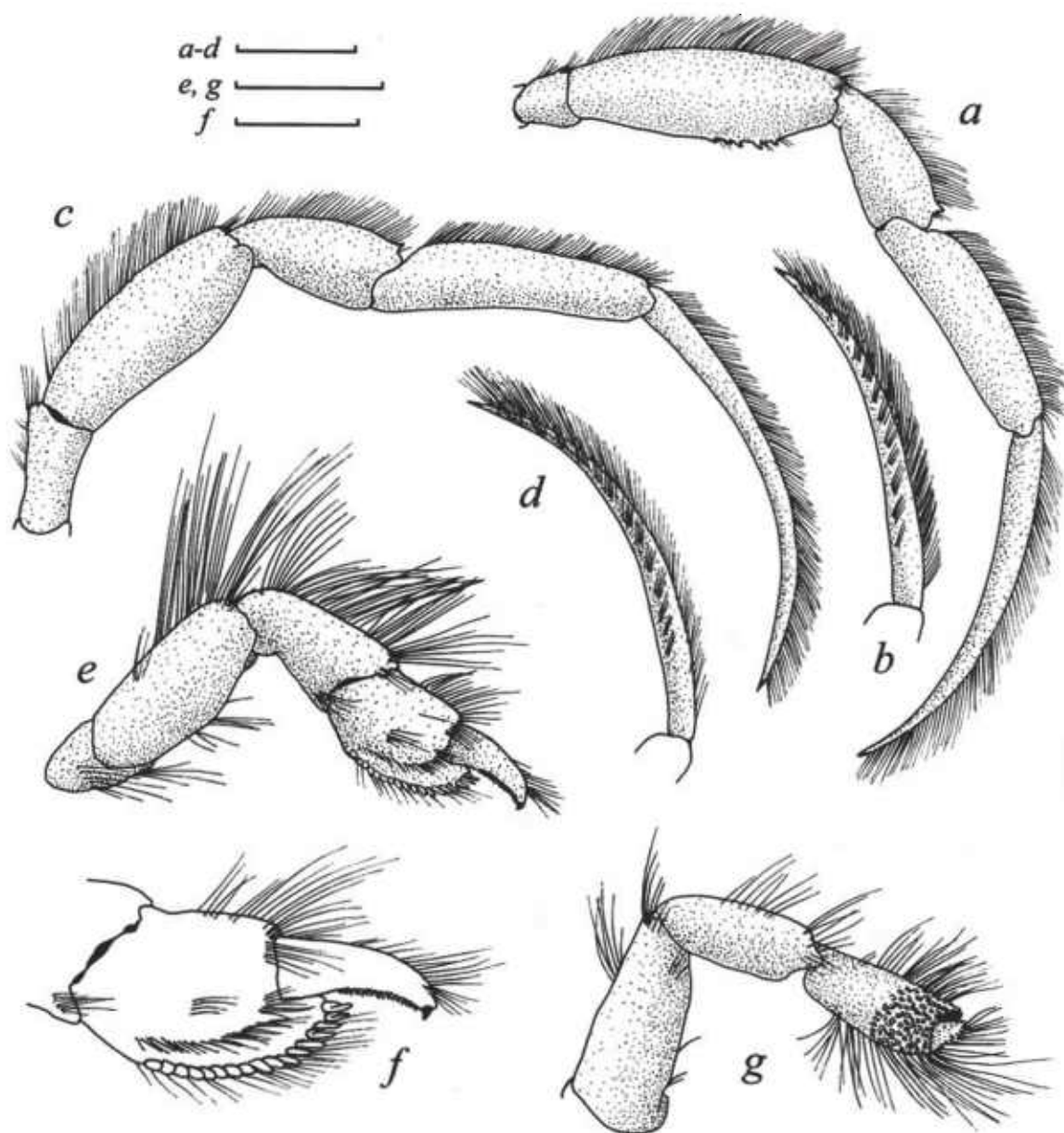


Figure 3: *Pagurus meloi* n. sp., male holotype sl = 4.2 mm, sta. P15E5a (INV-CRU 4833). a, second right pereopod, lateral view; b, dactyl of same, mesial view; c, third right pereopod, lateral view; d, dactyl of same, mesial view; e, fourth pereopod, lateral view; f, propodus and dactyl of same, lateral view; g, fifth pereopod, lateral view. Scales equal 2 mm (a-d), 1 mm (e, g), and 0.5 mm (f).

Coloration: Unknown.

Distribution: So far known only from off the Pacific coast of Colombia, from Bahía Humboldt near the Panama border, to Buenaventura. Depth: 65 to 295 m.

Etymology: It is a pleasure to name this species in honor of our esteemed Brazilian colleague, Dr. Gustavo A. Schmidt de Melo (Museu de Zoologia, Universidade de São Paulo), in recognition of his lifetime dedication to increase our knowledge of South American Crustacea in general, and of decapods in particular.

Nauplius

Remarks: *Pagurus meloi* n. sp. is distinguished from all other known eastern Pacific species of *Pagurus* by the following combination of characters: ocular acicles often lacking terminal or subterminal spines; antennal and antennular peduncles long, well exceeding corneas; chelipeds with numerous tufts or short rows of setae; second and third pereopods with long, slender

dactyls lacking ventral spines or spinules, and with dorsal margins of meri, carpi, propodi and dactyls fringed with long setae; anterior lobe of thoracic sternite XII (of third pereopods) subrectangular; and propodal rasp of fourth pereopod with single row of scales.

Pagurus meloi n. sp. bears some resemblance to two other eastern Pacific species, *P. imarpe* Haig, 1974 and *P. delsolari* Haig 1974. However, the new species differs from these two in a number of characters. In the new species there is a broadly rounded rostral lobe whereas the rostrum is acutely triangular in *P. imarpe* and *P. delsolari*; the ocular acicles often lack terminal or subterminal spines whereas the acicles are each always armed with a subterminal spine in *P. imarpe* and *P. delsolari*; the chelipeds have numerous setae dorsally on meri, carpi and chelae, and the second and third pereopods are fringed with long setae on the dorsal margins whereas these appendages are naked to sparsely setose in *P. imarpe* and *P. delsolari*; the posterior telsonal lobes have two to four corneous-tipped spines posteriorly whereas the lobes are unarmed in *P. imarpe* and *P. delsolari*; and the anterior lobe of thoracic sternite XII (of third pereopods) is subrectangular whereas the lobe is narrow and subovate in *P. imarpe* and *P. delsolari*.

There is also some similarity between *Pagurus meloi* n. sp. and two western Atlantic species, *P. rotundimanus* Wass, 1963, known from Florida, and *P. heblingi* Nucci and Melo, 2003, known from off Cabo Frio, Rio de Janeiro, Brazil. The three have somewhat similarly shaped chelipeds, second and third pereopods with long, slender dactyls, and gill shape (at least in *P. rotundimanus* as specimens of *P. heblingi* have not been available for examination). However, that is where the similarity ends. In other features such as the shape of the shield, armature of ocular acicles, relative length of the antennal acicles, setation of chelipeds and second and third pereopods, and shape and armature of telson, *P. meloi* n. sp. differs markedly from both *P. rotundimanus* and *P. heblingi*.

List and distributions of eastern Pacific *Pagurus* species, including group assignment

Pagurus albus (Benedict, 1892): Baja California, including Gulf of California, to Costa Rica (Hendrickx and Harvey, 1999); intertidal to 31 m. Group II (“*exilis*” group).

Pagurus aleuticus (Benedict, 1892): North Pacific, from Japan, and Bearing Sea to California; 15 to 435 m (McLaughlin, 1974; Haig and Wicksten, 1975; Wicksten, 1989). Group V (“*bernhardus*” group).

Pagurus annexus McLaughlin and Haig, 1993: Baja California, including Gulf of California, to Guatemala; 3 to 40 m (McLaughlin and Haig, 1993; Hendrickx and Harvey, 1999). Group I (“*provenzano*” group).

Pagurus arenisaxatilis Harvey and McLaughlin, 1991: Gulf of California; intertidal to 30 m (Harvey and McLaughlin, 1991; Hendrickx and Harvey, 1999). Group I (“*provenzano*” group).

Pagurus armatus (Dana, 1851): Alaska to California; 11 to 146 m (McLaughlin, 1974). Group V (“*bernhardus*” group).

Pagurus benedicti (Bouvier, 1898): Baja California, including Gulf of California, to Ecuador, including Galapagos Islands and Alijos Rocks; 2 to 84 m (McLaughlin and Haig, 1993; Hendrickx and Harvey, 1999). Group I (“*provenzano*” group).

Pagurus beringanus (Benedict, 1892): Bering Sea to California; intertidal to 82 m (McLaughlin, 1974). Group III (“*comptus*” group).

Pagurus brandti (Benedict, 1892): Chukchi Sea to Bering Sea; 60 to 80 m (McLaughlin, 1974). Group VIII (“*trigonocheirus*” group).

Pagurus capillatus (Benedict, 1892): North Pacific, from Kamchatka, Okhotsk Sea, Sea of Japan, North Korea, Arctic Ocean, Bering Sea, and British Columbia (Canada) to California; 4 to 1189 m (McLaughlin, 1974; Wicksten, 1989). Group VI (“*capillatus*” group).

Pagurus caurinus Hart, 1971: Alaska to Washington; intertidal to 124 m (McLaughlin, 1974). Questionably Group I ("provenzanoi" group).

Pagurus comptus White, 1847: southeastern Pacific, from Chile to Magellan region; and southwestern Atlantic, from Patagonia to Uruguay, including the Falkland Islands (Malvinas); 10 to 150 m (Forest and de Saint Laurent, 1968; Boschi *et al.*, 1992). Group III ("comptus" group).

Pagurus confragosus (Benedict, 1892): Alaska to Oregon; 55 to 435 m (McLaughlin, 1974; Wicksten, 1989). Group VII ("confragosus" group).

Pagurus cornutus (Benedict, 1892): North Pacific, from Okhotsk Sea, and Bering Sea to Oregon; 160 to 830 m (McLaughlin, 1974; Wicksten, 1989). Group VII ("confragosus" group).

Pagurus dalli (Benedict, 1892): Bering Sea to Oregon; low water to 276 m (McLaughlin, 1974). Group VIII ("trigonocheirus" group).

Pagurus delsolari Haig, 1974: Peru to Chile; 275 to 650 m (Haig, 1974). Group IX (unnamed).

Pagurus edwardsii (Dana, 1852): Peru to Chile; shallow water (Haig, 1955; Carvacho and Saavedra, 1994). Group III ("comptus" group).

Pagurus forceps H. Milne Edwards, 1836: southeastern Pacific, from Chile to Tierra del Fuego; and southwestern Atlantic, from Falkland Islands (Malvinas); shore to 660 m (Haig, 1955; Boschi *et al.*, 1992). Group III ("comptus" group).

Pagurus gladius (Benedict, 1892): Baja California, including Gulf of California, to Ecuador (Haig *et al.*, 1970; Hendrickx and Harvey, 1999); 13 to 82 m. Group II ("exilis" group).

Pagurus granosimanus (Stimpson, 1859): Unalaska to Lower California; intertidal to 32 m (McLaughlin, 1974). Group III ("comptus" group).

Pagurus hartae (McLaughlin and Jensen, 1996): British Columbia (Canada) to southern California; 6 to 635 m (McLaughlin and Jensen, 1996, as *Parapagurodes hartae*; McLaughlin and Asakura, 2004). Group unassigned.

Pagurus hemphilli (Benedict, 1892): British Columbia (Canada) to California; intertidal to undetermined depth (McLaughlin, 1974). Group III ("comptus" group).

Pagurus hirsutiussculus (Dana, 1851): North Pacific, from Japan, and Alaska to California; intertidal to 110 m (Crain and McLaughlin, 1993). Group III ("comptus" group).

Pagurus imarpe Haig, 1974: Peru; 570 to 980 m (Haig, 1974). Group IX (unnamed).

Pagurus kennerlyi (Stimpson, 1854): North Pacific, from Japan, and Aleutian Islands to Washington; intertidal to 274 m (McLaughlin, 1974). Group VI ("capillatus" group).

Pagurus lepidus (Bouvier, 1898): Baja California, including Gulf of California, to Peru; intertidal to 20 m (Haig and McLaughlin, 1991; Hendrickx and Harvey, 1999). Group I ("provenzanoi" group).

Pagurus meloi n. sp.: Colombia; 65 to 295 m (Lemaitre and Cruz Castaño, this study). Group unassigned.

Pagurus mertensii Brandt, 1851: North Pacific, from Kamchatka to Alaska; depth range unknown (McLaughlin, 1974). Group II ("exilis" group).

Pagurus middendorffii Brandt, 1851: North Pacific, from Japan, and Bering Sea to Washington; intertidal (McLaughlin, 1974). Group III ("comptus" group).

Pagurus nanodes Haig and Harvey, 1991: Costa Rica to Ecuador; intertidal to 3.5 m (Haig and Harvey, 1991; Hendrickx and Harvey, 1999). Group I ("provenzanoi" group).

Pagurus nesiotetes Haig and McLaughlin, 1991: Clipperton, Malpelo, and Galapagos Islands; subtidal to 60 m (Haig and McLaughlin, 1991; Hendrickx and Harvey, 1999). Group I ("provenzanoi" group).

Pagurus ochotensis Brandt, 1851: Siberia to Oregon; subtidal to 249 m (McLaughlin, 1974). Group V ("bernhardus" group).

Pagurus parvus (Benedict, 1892): ?Gulf of California (Hendrickx and Harvey, 1999); 21 m. Group unassigned. (It is questionable whether this taxon occurs in the eastern Pacific. Benedict (1892: 26) did not list any specimens, and cited only "Gulf of California" in his description; however, the type (USNM 16714) and only known specimen is labeled as from off Rio de La Plata, Argentina, *Albatross* station 2764, in the southwestern Atlantic).

Pagurus perlatus H. Milne Edwards, 1848: Peru to Chile (Hendrickx and Harvey, 1999); shore. Group II ("*exilis*" group).

Pagurus quaylei Hart, 1971: British Columbia (Canada) to Baja California; 2 to 97 m (McLaughlin, 1974). Questionably Group I ("*provenzano?*" group).

Pagurus rathbuni (Benedict, 1892): North Pacific, from Sea of Japan, Siberia, Kamchatka, Okhotsk Sea, Chukchi Sea, Arctic Ocean, and Bering Sea; 9 to 210 m (McLaughlin, 1974). Group unassigned.

Pagurus redondoensis Wicksten, 1982: southern California; 0 to 50 m (Wicksten, 1982). Group I ("*provenzano?*" group).

Pagurus retrorsimanus Wicksten and McLaughlin, 1998: California, and Los Coronados Islands in the Gulf of California; 11 to 90 m (Wicksten and McLaughlin, 1998). Group unassigned.

Pagurus rhabdotus Haig and Harvey, 1991: west coast of Baja California; 2 to 20 m (Hendrickx and Harvey, 1999). Group I ("*provenzano?*" group).

Pagurus samuelis (Stimpson, 1857): Vancouver Island to Baja California; intertidal to undetermined depth (McLaughlin, 1974). Group III ("*comptus*" group).

Pagurus setosus (Benedict, 1892): Alaska to California; 9 to 476 m (McLaughlin, 1974). Group VI ("*capillatus*" group).

Pagurus smithi (Benedict, 1892): Baja California, including Gulf of California (Hendrickx and Harvey, 1999); rarely < 40 m (Haig *et al.*, 1970). Group X (unnamed, McLaughlin, pers. comm).

Pagurus spighti McLaughlin and Haig, 1993: Panama; intertidal (Hendrickx and Harvey, 1999). Group I ("*provenzano?*" group).

Pagurus spilocarpus Haig, 1977: California to Baja California; intertidal to 71 m (Haig, 1977). Group X (unnamed, McLaughlin, pers. comm).

Pagurus stevensae Hart, 1971: Bering Sea to Washington; 26 to 198 m (McLaughlin, 1974). Group VIII ("*trigonocheirus*" group).

Pagurus tanneri (Benedict, 1892): Bering Sea to California; 92 to 1372 m (McLaughlin, 1974; Wicksten, 1989). Group VII ("*confragosus*" group).

Pagurus townsendi (Benedict, 1892): Alaska; 519 to 1143 m (McLaughlin, 1974). Group unassigned.

Pagurus trigonocheirus (Stimpson, 1858): North Pacific, from Sea of Japan, Arctic Ocean, Chukchi Sea, Bering Sea, and Alaska; subtidal to 182 m (McLaughlin, 1974). Group VIII ("*trigonocheirus*" group).

Pagurus undosus (Benedict, 1892): North Pacific, from Sea of Japan, Okhotsk Sea, Chukchi Sea, Bering Sea, and Alaska; 18 to 64 m (McLaughlin, 1974). Group VIII ("*trigonocheirus*" group).

Pagurus venturensis Coffin, 1957: southern California; intertidal to undetermined depth (Crain and McLaughlin, 1993). Group unassigned.

Pagurus vetaultae Harvey and McLaughlin, 1991: Gulf of California to Panama; 1 to 7 m (Hendrickx and Harvey, 1999). Group I ("*provenzano?*" group).

Pagurus villosus Nicolet, 1849: Peru to Chile; shallow water to 73 m (Haig, 1955). Group I ("*provenzano?*" group).

Pagurus virgulatus Haig and Harvey, 1991: Mexico to Ecuador, including Cocos Island; 5 to 40 m (Hendrickx and Harvey, 1999). Group I ("*provenzano?*" group).

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