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A New Hermit Crab Species of *Pylopaguropsis* (Crustacea: Decapoda: Anomura: Paguridae) from the Western Pacific, and Supplemental Note on *P. laevispinosa* McLaughlin and Haig

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ABSTRACT—*Pylopaguropsis vicina*, a new species of the Paguridae, is described and illustrated from southern Japan and Indonesia. This new species is most similar to *P. laevispinosa* McLaughlin and Haig, but is distinguished by the armature of the chelae and ambulatory dactyli, spination of the telson, and stripe pattern of the pereopods. Reexamination of specimens referred to *P. laevispinosa* by recent authors has shown these assignments to be incorrect. A brief supplemental description is provided for *P. laevispinosa* in order to clarify its systematic status. An amended key to species of the genus *Pylopaguropsis* is presented.

Key words: Crustacea, Decapoda, Anomura, *Paguridae, Pylopaguropsis*, new species, western Pacific

INTRODUCTION

The pagurid genus *Pylopaguropsis* Alcock, 1905 contains colorful hermit crab species, which attract marine divers and aquarists. It currently contains 13 species from the world, of which 11 species are known from the Indo-Pacific. McLaughlin and Haig (1989) revised the genus and described seven new species. Recently Asakura (2000) reviewed the Japanese species of the genus, describing two new species.

In the course of a continuing survey on sublittoral and deep-water fauna in the Nansei Islands, southern Japan, using TRV "Toyoshio-maru" of Hiroshima University, extensive collections of decapod crustaceans have been made by the authors since 1994. During the study of these collections, we discovered a species closely resembling *Pylopaguropsis laevispinosa* McLaughlin and Haig, 1989, a taxon reported from Japan and Indonesia (McLaughlin and Haig, 1989; McLaughlin 1997; Asakura, 2000). Upon examination of the holotype and paratype of *P. laevispinosa*, we found our specimens can be differentiated from that species by some differences that warrant a description of a new species. Reexamination of the specimens referred to *P. laevispinosa* by McLaughlin (1997; from Indonesia) and Asakura (2000; from Japan) has revealed that these specimens also represent the same species as our specimens, instead of the true *P. laevispinosa*. In this paper, a new species, *Pylopaguropsis vicina*, is described and illustrated based on eight specimens. Several details which are not mentioned in the previous descriptions of *P. laevispinosa* (cf. McLaughlin and Haig, 1989; Asakura, 2000) are provided in order to facilitate comparison with the new species. An amended key to aid in the identification of the species of the genus *Pylopaguropsis* is presented.

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MATERIALS AND METHODS

The specimens of the new species are deposited in the following institutions: Natural History Museum and Institute, Chiba (CBM, with a code of ZC); Osaka Museum of Natural History (OMNH, with a code of Ar); National Science Museum, Tokyo (NSMT, with a code of Cr); Muséum national d'Histoire naturelle, Paris (MNHN, with a code of Pg). The type material of *Pylopaguropsis laevispinosa* is housed in the National Museum of Natural History, Smithsonian Institution (USNM). The shield length, abbreviated as sl, is measured from the tip of rostrum to the midpoint of posterior margin of the shield. For detailed observation of the surface structures, specimens (including removed appendages) were stained with methylene blue. The usage of the terminology generally follows McLaughlin (1997), except for gill structure (see McLaughlin and de Saint Laurent, 1998), dactylus (dactyli) for dactyl (dactyls), and

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numbered thoracic sternites. The drawings were made with the aid of a drawing tube mounted on a Leica MZ8 stereomicroscope.

TAXONOMY

***Pylopaguropsis* vicina sp. nov.** (Figs. 1–5)

Pagurus zebra – Miyake and Imafuku, 1980: 60 (part).

Pylopaguropsis laevispinosa – McLaughlin, 1997: 544 (part), figs. 30b, d, 44a-b; Asakura, 2000: 88 (part).

Material examined: Holotype. TRV "Toyoshio-maru", 1996-5 cruise: station 9, N of Yakushima Island, 30°27.80'N, 130°35.30'E, 95 m, 3 June 1996, dredge, coll. T. Komai, ovigerous female (sl 4.6 mm) (CBM-ZC 6933).

Paratypes. TRV "Toyoshio-maru", 1998-4 cruise: station 19, W of Yaebishi, Miyako Island, Ryukyus, 24°59.00'N, 125°11.00'E, 101 m, dredge, coll. E. Tsuchida, 1 female (sl 3.8 mm) (CBM-ZC 5557); off Shionomisaki, Kii Peninsula, Japan, 33°30'N, 135°45'E, 50–80 m, 1978, dredge, coll. S. Nagai, 1 male (sl 2.8 mm) (OMNH-Ar 2016); TRV "Toyoshio-maru", 2003-3 cruise: station 15, Oshima-shinsone, about 39 km N of Amami-Oshima Island, Ryukyus, 28°52.14'N, 129°32.99'E, 163–167 m, 27 May 2003, dredge, coll. M. Osawa, 1 male (sl 4.0 mm) (NSMT-Cr 14557);

Other specimens. KARUBAR: station DW 22, Kai Islands, Banda Sea, Indonesia, 05°22'S, 133°01'E, 85-124 m, 25 October 1991, dredge, 3 males (sl 1.2–3.3 mm) (MNHN-Pg 5315); station DW 30, Kai Islands, 05°39'S, 132°56'E, 111–118 m, 26 October 1991, dredge, 1 female (sl 2.3 mm) (MNHN-Pg 5316).

Description: Thirteen pairs of biserial phyllobranchiae.

Shield (Fig. 1A) slightly longer than broad; anterior margin between rostrum and lateral projections weakly concave; anterolateral margins sloping; posterior margin roundly truncate; dorsal surface polished, with some pairs of tufts of short setae. Rostrum triangular, terminating in small spine and distinctly overreaching lateral projections. Lateral projections obtusely triangular, unarmed or triangular with small marginal spine.

Ocular peduncles (Fig. 1A) relatively long, 0.9-1.0 times as long as shield; corneas very slightly dilated. Ocular acicles triangular, terminating in marginal spinule.

Antennular peduncles (Fig. 1A) moderately long, slightly overreaching distal margins of corneas. Ultimate segment slightly widened distally in dorsal and lateral views, with 3 short to long setae on dorsolateral distal angle. Penultimate segment with few short setae. Basal segment with small spine on lateral face of statocyst lobe.

Antennal peduncles (Fig. 1A) not reaching or reaching distal margins of corneas. Fifth and fourth segments with few scattered short setae. Third segment with small spine at ventromesial distal angle. Second segment with dorsolateral distal angle produced, overreaching mid-length of fourth segment, terminating in small spine; dorsomesial distal angle with small spine; mesial margin with few short setae. First segment with ventromesial distal margin produced and with 1 spine laterally. Antennal acicle not reaching base of cornea, somewhat arcuate, with row of sparse setae on mesial margin. Flagellum long, far overreaching tip of right cheliped.

Mandible (Fig. 2A) weakly dentate on distal margin of incisor process. Maxillule (Fig. 2B) with subrectangular coxal endite; endopod with slightly produced internal lobe bearing 1 bristle, external lobe slightly delineated. Maxilla (Fig. 2C) with moderately broad scaphognathite; endopod distinctly overreaching anterior margin of scaphognathite. First maxilliped (Fig. 2D) with moderately narrow basal portion of exopod. Second maxilliped (Fig. 2E) with moderately slender endopod; flagellum on exopod elongate. Third maxilliped (Fig. 2F) moderately slender; ischium (Fig. 2G) with well developed crista dentata composed of row of stout corneous teeth and 1 accessory tooth; basis (Fig. 2G) with 2 denticles on mesial margin; exopod distinctly overreaching distal margin of merus.

Right cheliped (Figs. 3A, B and 4A, B) appreciably larger than left. Chela somewhat dorsoventrally compressed, general outline subovate in dorsal view. Dactylus slightly longer than palm, somewhat curved ventrally, terminating in small calcareous tooth; articulation slightly oblique; dorsal surface with single or double row of blunt spines decreasing in size distally on somewhat elevated midline, moderately spaced small, low tubercles on mesial part, and shallow longitudinal groove mesiad of midline; dorsomesial margin with row of large, blunt or subacute spines decreasing in size distally and few short setae; mesial face concave, ventromesial margin with row of small tubercles; cutting edge with 2 separated prominent calcareous teeth interspersed by row of very small calcareous teeth in proximal 0.6 and with row of small corneous teeth in distal 0.4, terminating in small corneous claw. Palm slightly shorter than carpus; dorsomesial margin with single row of moderately large, blunt or subacute spines; dorsal surface of palm and fixed finger with several to numerous blunt or subacute spines, sometimes forming irregular rows (spines on palm large, but those on fixed finger much smaller), many spines naked except for few spines bearing 1 or 2 short setae arising at base; dorsolateral margin (including fixed finger) somewhat upturned, with row of large, acute or blunt spines, strongest on palm; mesial face with small to moderately small tubercles and with few short to moderately long setae; ventral surface weakly convex, tuberculate, with few moderately long setae. Fixed finger with shallow, but distinct longitudinal groove on dorsal surface extending onto palm; cutting edge with 1 large, low calcareous tooth proximally and with row of small, closely set calcareous teeth on distal 0.7, terminating in small, bifid corneous claw. Carpus subequal to or slightly longer than merus; dorsomesial margin weakly delimited, with row of moderately large spines; dorsolateral margin not distinctly delimited, but with row of moderately large spines; dorsal surface with transverse row of moderately large spines adjacent to dorsodistal margin, few small spines and sparse long setae; lateral face with small to moderately large spines and long setae on dorsal half,

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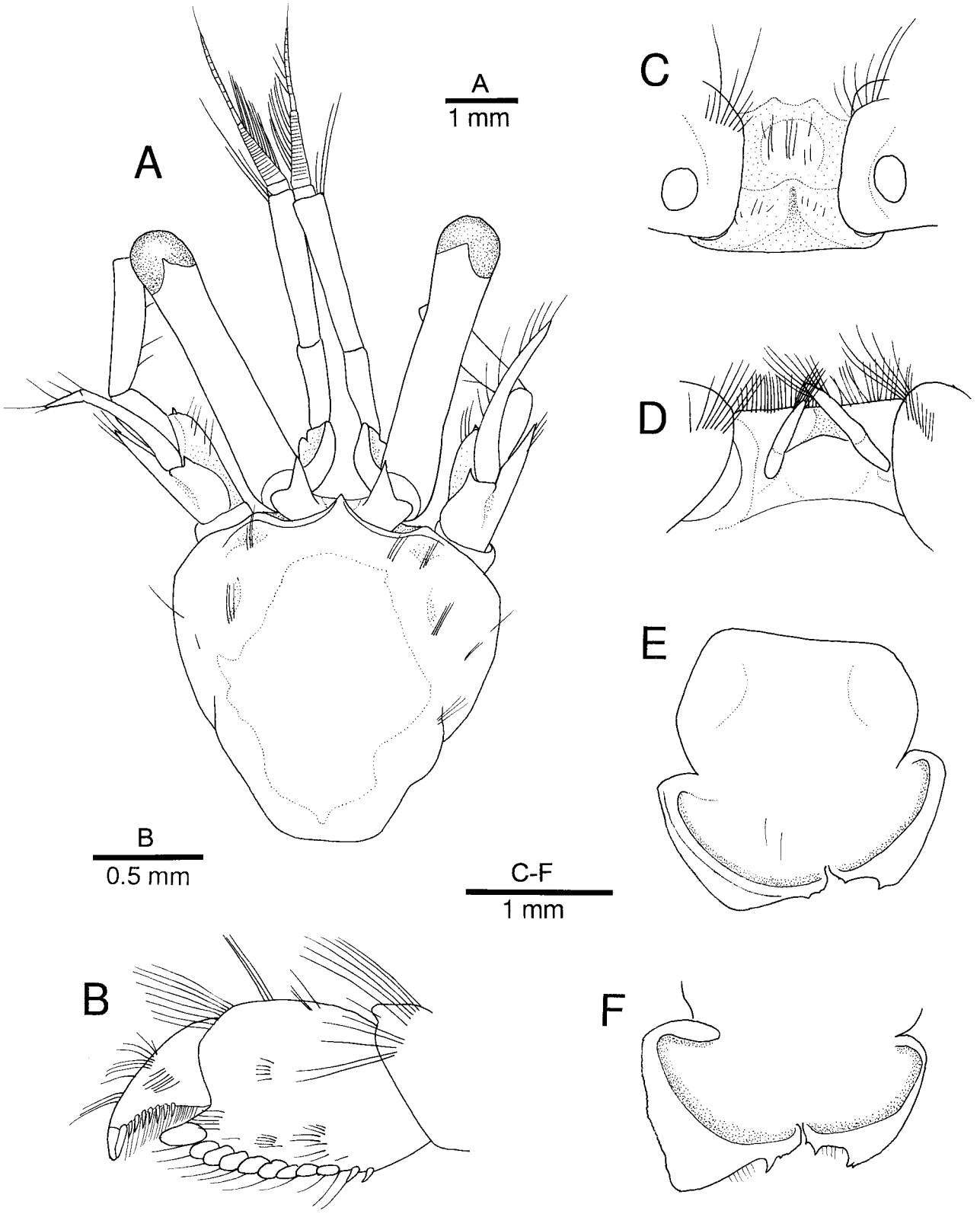


Fig. 1. *Pylopaguropsis vicina* sp. nov. Holotype, ovigerous female (sl 4.6 mm; CBM-ZC 6933). A, shield and cephalic appendages, dorsal view (left antennal acicle broken); B, dactylus, propodus and distal part of carpus of left fourth pereopod, lateral view; C, sixth thoracic sternite (coxae of third pereopods are partially depicted), ventral view; D, eighth thoracic sternite and first pleopods (coxae of fifth pereopods are partially depicted), ventral view; E, telson, dorsal view; F, posterior lobe of telson, posterodorsal view.

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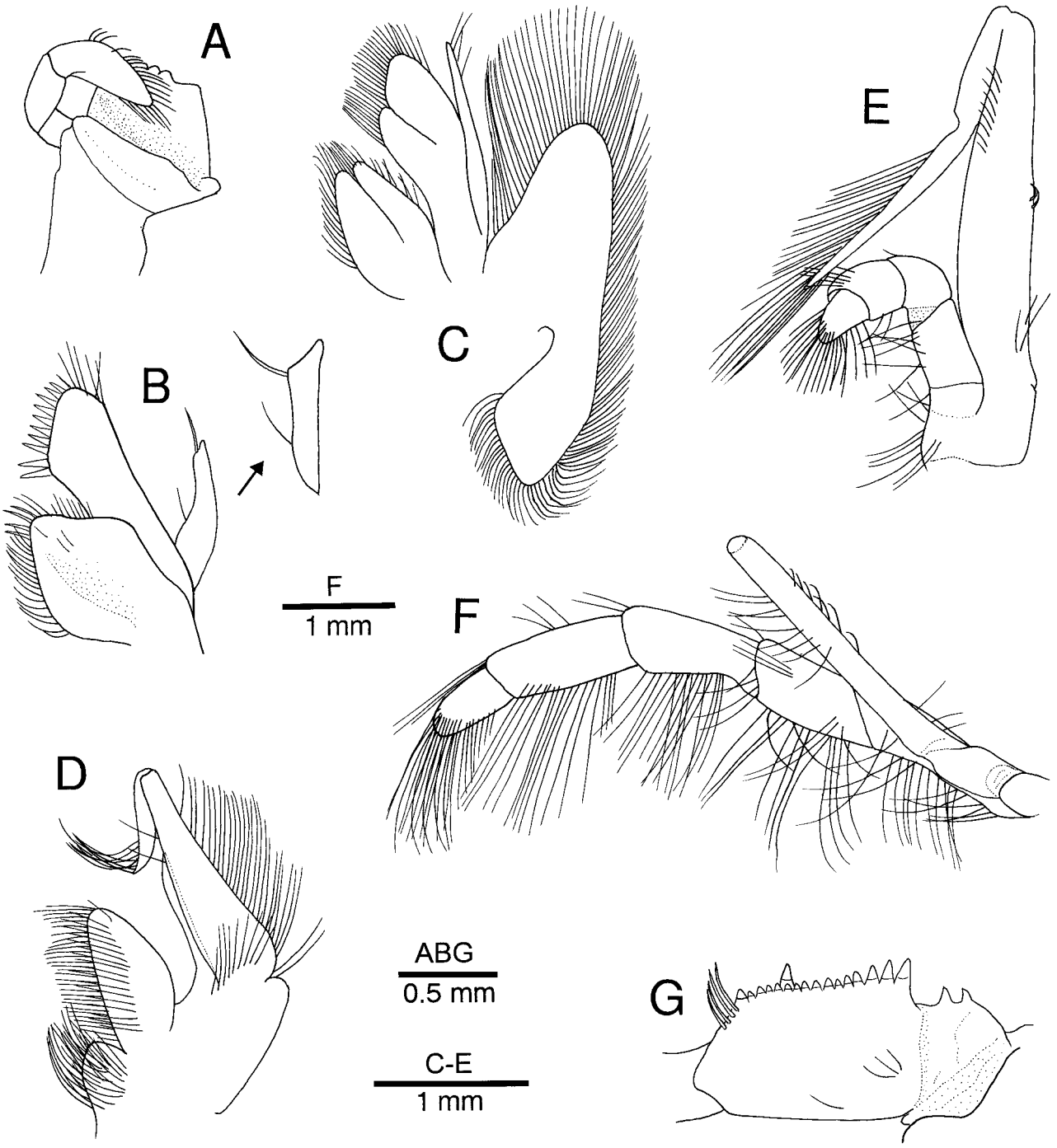


Fig. 2. *Pylopaguropsis vicina* sp. nov. Holotype, ovigerous female (sl 4.6 mm; CBM-ZC 6933). Left mouthparts. A, mandible, dorsal view; B, maxillule, ventral view; inset, endopod, lateral view; C, maxilla, ventral view; D, first maxilliped, ventral view; E, second maxilliped, ventral view; F, third maxilliped, lateral view (flagellum of exopod not visible); G, same, ischium and basis, dorsal view.

and with small tubercles on ventral half; mesial face with few small, low tubercles; ventral surface tuberculate, with sparse short setae. Merus unarmed on dorsal surface; dorsodistal margin unarmed; lateral face with several tiny tubercles; ventrolateral margin with row of small spines; mesial face smooth; ventromesial margin with row of moderately large spines (1 or 2 proximal spines largest); ventral surface concave, with some tubercles and sparse moderately long setae. Ischium with few tiny tubercles on ventromesial margin.

Left cheliped (Fig. 4C–E) slender, propodal-carpal articulation not strongly twisted. Dactylus slightly longer than palm; dorsal surface shallowly sulcate medially, mesially with row of moderately small blunt or subacute spines decreasing in size distally, and laterally with row of tiny tubercles; dorsomesial margin with row of moderately large, blunt or subacute spines decreasing in size distally, extend-

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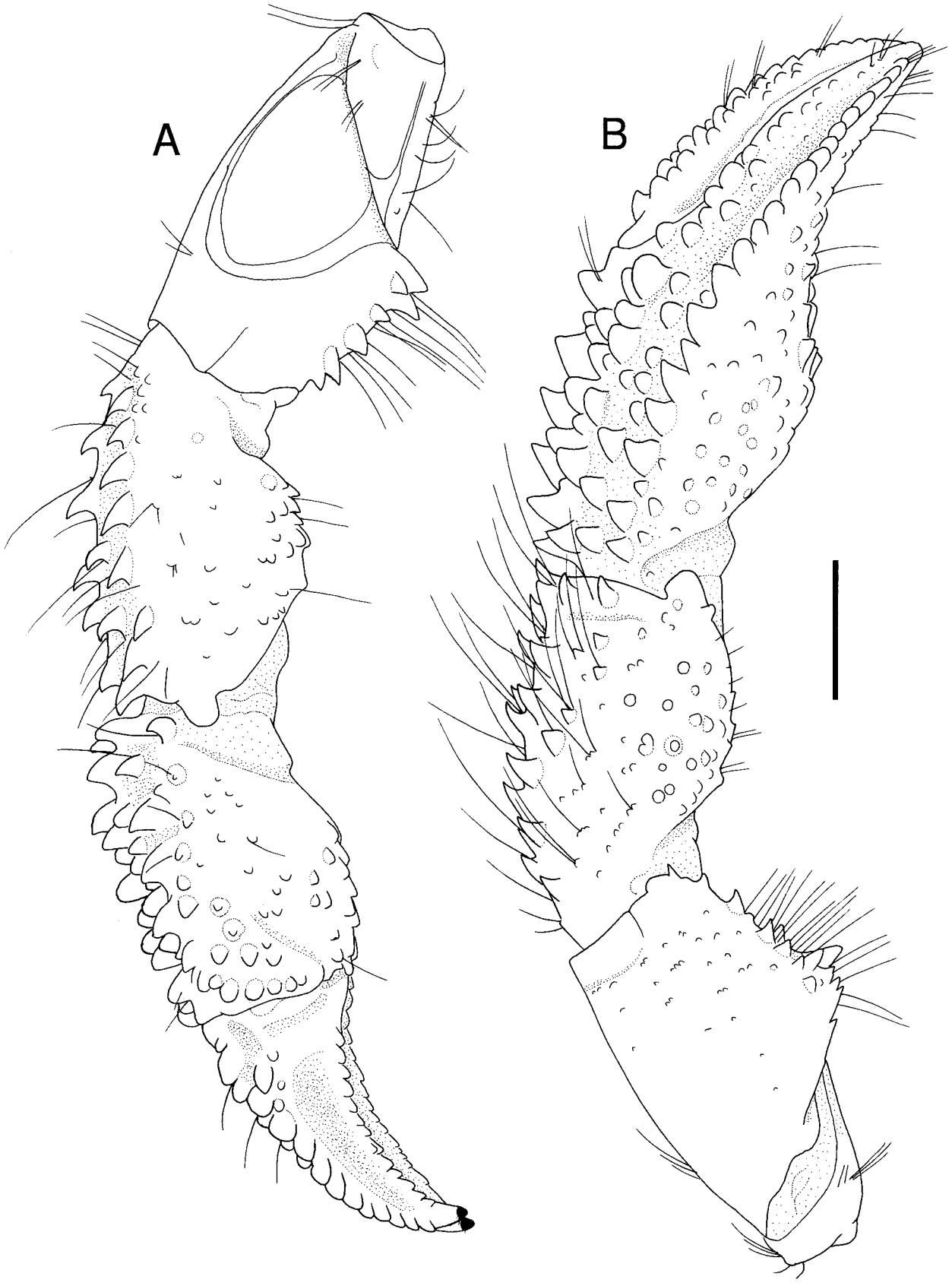


Fig. 3. *Pylopaguropsis vicina* sp. nov. Holotype, ovigerous female (sl 4.6 mm; CBM-ZC 6933). A, right cheliped, mesial view; B, same, lateral view. Scale bar = 2 mm.

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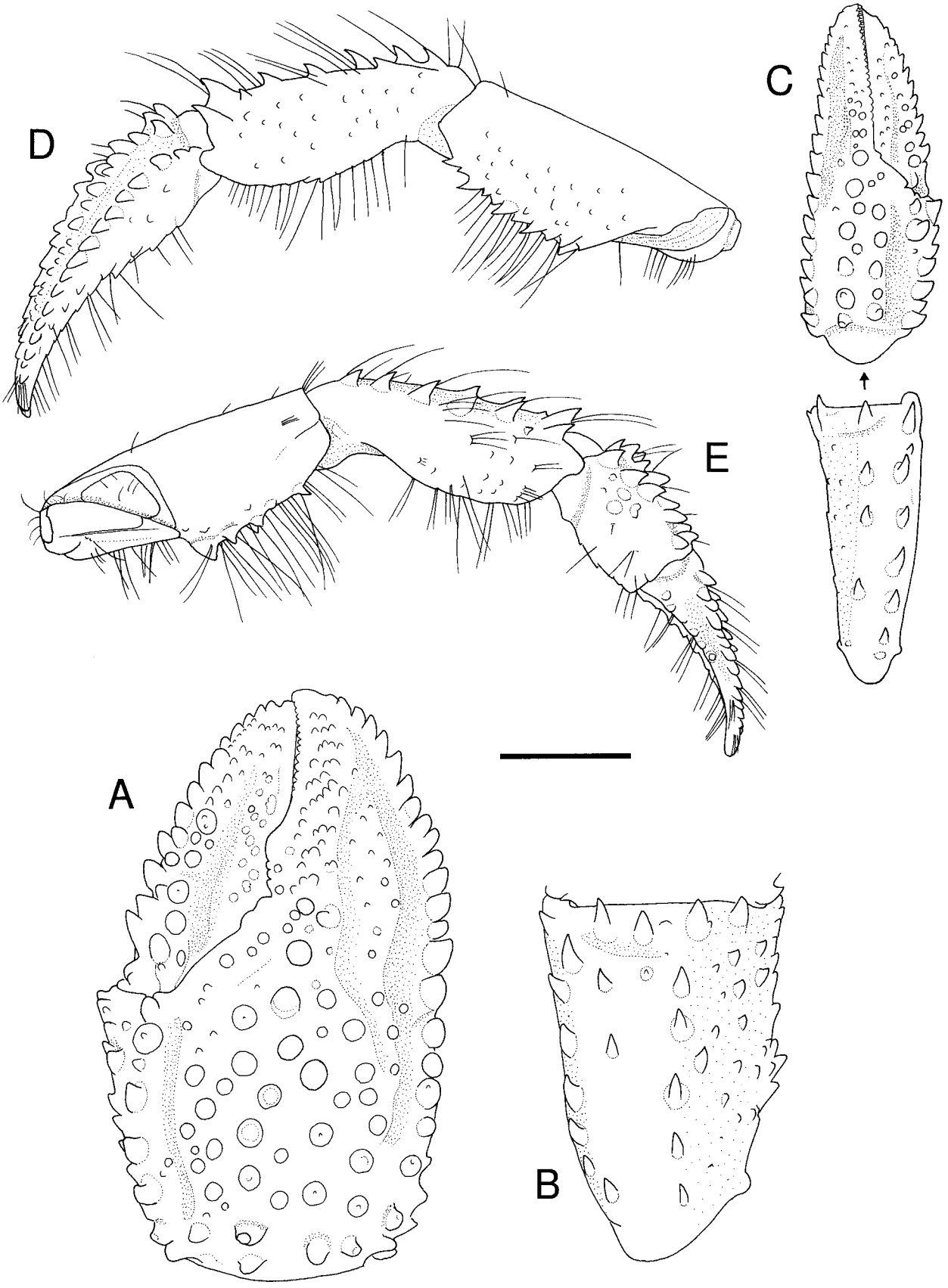


Fig. 4. *Pylopaguropsis vicina* sp. nov. Holotype, ovigerous female (sl 4.6 mm; CBM-ZC 6933). A, right chela, dorsal view; B, carpus of right cheliped, dorsal view; C, chela and carpus of left cheliped, dorsal view; D, left cheliped, lateral view; E, same, mesial view.

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ing near tip, and with sparse setae; mesial face with row of small, blunt spines ventrally; ventral surface with row of tufts of long setae. Palm with 2 rows of large, blunt or subacute spines on weakly elevated midline, 1 extending onto fixed finger as small tubercles; dorsolateral and dorsomesial margins somewhat elevated, each with row of moderately large spines; mesial face with some low protuberances proximally; ventral surface with low protuberances and tufts of setae. Carpus subequal in length to merus; dorsal surface with 2 rows of spines, strongest distally; lateral and mesial faces weakly tuberculate, with few tufts of moderately long setae; ventral surface with scattered low tubercles and tufts of long setae. Merus unarmed on dorsal surface; lateral face weakly tuberculate, ventrolateral margin with row of moderately small spines; mesial face smooth, ventromesial margin with row of spines (proximalmost spine largest); ventral surface with few tubercles and sparse setae. Ischium unarmed on ventromesial margin.

Second and third pereopods (Fig. 5A–C) generally similar. Dactyli (Fig. 5A, B, D, E) slightly twisted in dorsal view, weakly curved ventrally in lateral view, slender, 1.4–1.6 times as long as propodi in second, 1.5–1.9 times in third, terminating in large corneous claws; dorsal margins each with fine row of long bristles; lateral faces each with faint, longitudinal sulcus on proximal half in second and left third, with distinct shallow sulcus on proximal half in right third, each with row of short setae dorsally; mesial faces each with dorsal row of 6–12 small corneous spines increasing in size distally and with short median row of corneous spinules proximally in third, also each with faint longitudinal sulcus proximally; ventral margins each with 6–11 small corneous spines. Propodi distinctly longer than carpi; dorsal surfaces with scattered setae; ventral surfaces each with 1–3 corneous spinules in distal half. Carpi each with 3 small spines (including dorsodistal spine) (second) or with dorsodistal spine (reduced in holotype) and 0–2 additional spinules (third) on dorsal surface. Meri unarmed, with scattered setae on dorsal and ventral margins. Ischia each with scattered setae on dorsal and ventral margins, somewhat elongate in third.

Fourth pereopods semichelate (Fig. 1B). Dactylus short, broad, with row of small corneous teeth on ventral margin (distalmost tooth much larger than other teeth). Propodal rasp composed of 1 row of small corneous scales extending beyond midlength of propodus. Carpus with blunt projection on dorsodistal margin.

Sixth thoracic sternite (Fig. 1C) with anterior lobe poorly delineated, semicircular. Eighth thoracic sternite (Fig. 1D) slightly bilobed with faint median notch, with row of setae on anterior and posterior margins.

Abdomen dextrally twisted. Female with paired first pleopods (Fig. 1D) and subequally biramous, unpaired second to fifth pleopods. Male with unequally biramous, unpaired third to fifth pleopods.

Telson (Fig. 1E, F) with distinct transverse indentations; posterior lobes with anterolateral margins forming light angles and posterior margin of left somewhat expanded laterally; margins slightly elevated on dorsal surface; terminal margins slightly oblique, each with 1–5 small spines not extending onto lateral margin.

Coloration in life. Shield orange-tinged, with light orange patch anterolaterally, rostral margin not accentuated. Ocular peduncles generally cream, dark-colored distally. Ocular acicles cream. Antennular peduncles entirely cream. Antennal peduncles each with orange longitudinal stripe on fifth segment laterally and mesially; second segment orange-tinged; acicle entirely cream; flagella pale red. Right chela generally cream, with orange-red tinge at articulation between palm and carpus; dactylus with spot of orange on dorsal surface proximally; carpus with tinge of orange proximally, but without stripes; merus orange and white striped on dorsal face. Left cheliped similar to right cheliped in general color pattern; carpus with short longitudinal stripes on dorsal surface proximally; merus orange and white striped dorsally and on dorsal half of lateral face. Second and third pereopods with orange and white longitudinal stripes (Fig. 5F); on dactylus, 2 orange stripes visible in lateral view; on propodus, 3 orange stripes visible in lateral view, including stripe on dorsal surface; on carpus, 3 orange stripes visible in lateral view, including stripe on ventral surface; on merus, 3 orange stripes visible in lateral view, including stripe on dorsal surface; on ischium, 3 orange stripes visible in lateral view, including stripes on dorsal and ventral surfaces. Eggs orange-red.

Variations: A considerable variation is seen in the armature of the chelae. The dorsal spines on the palms are less numerous in the Japanese specimens than in the specimens from Indonesia. In one specimen from Indonesia (sl 2.3 mm, MNHN-Pg 5316), the dorsal spines on the palms of the chelae are subconical to conical, while in other specimens, the dorsal spines are blunt, not conical. In one specimen (sl 1.2 mm, NNHN-Pg 5315), the smallest among the specimens examined, the longitudinal grooves on the dactylus and fixed finger are obscure, while in the other specimens those grooves are distinct.

Distribution: So far known with certainty only from Kii Peninsula and Nansei Islands, Japan, and Banda Sea, Indonesia, at depths of 50–167 m.

Habitat: One of the paratypes (NSMT-Cr 14557) was collected from Oshima-shinsone, which is situated on a top of a small seamount in the Amami Trough (about 800 m deep). The bottom is rough and bottom current is probably strong. The catch by the dredge included enormous amounts of various sponges (in particular *Stelletta* spp.) and alcyonacean and gorgonacean corals. An unusual, spherical astreroid, *Podosphaeraster toyoshiomaruae* Fujita and Rowe, was also obtained in this locality (Fujita and Rowe, 2002). Other species of *Pylopaguropsis*, such as *P. fimbriata* McLaughlin and Haig, 1989, *P. keijii* McLaughlin and Haig, 1989 and *P. speciosa* McLaughlin and Haig, 1989, usually inhabit crevices of coral and rocky reefs or among large dead coral plates or blocks (Kato and Okuno, 2001;

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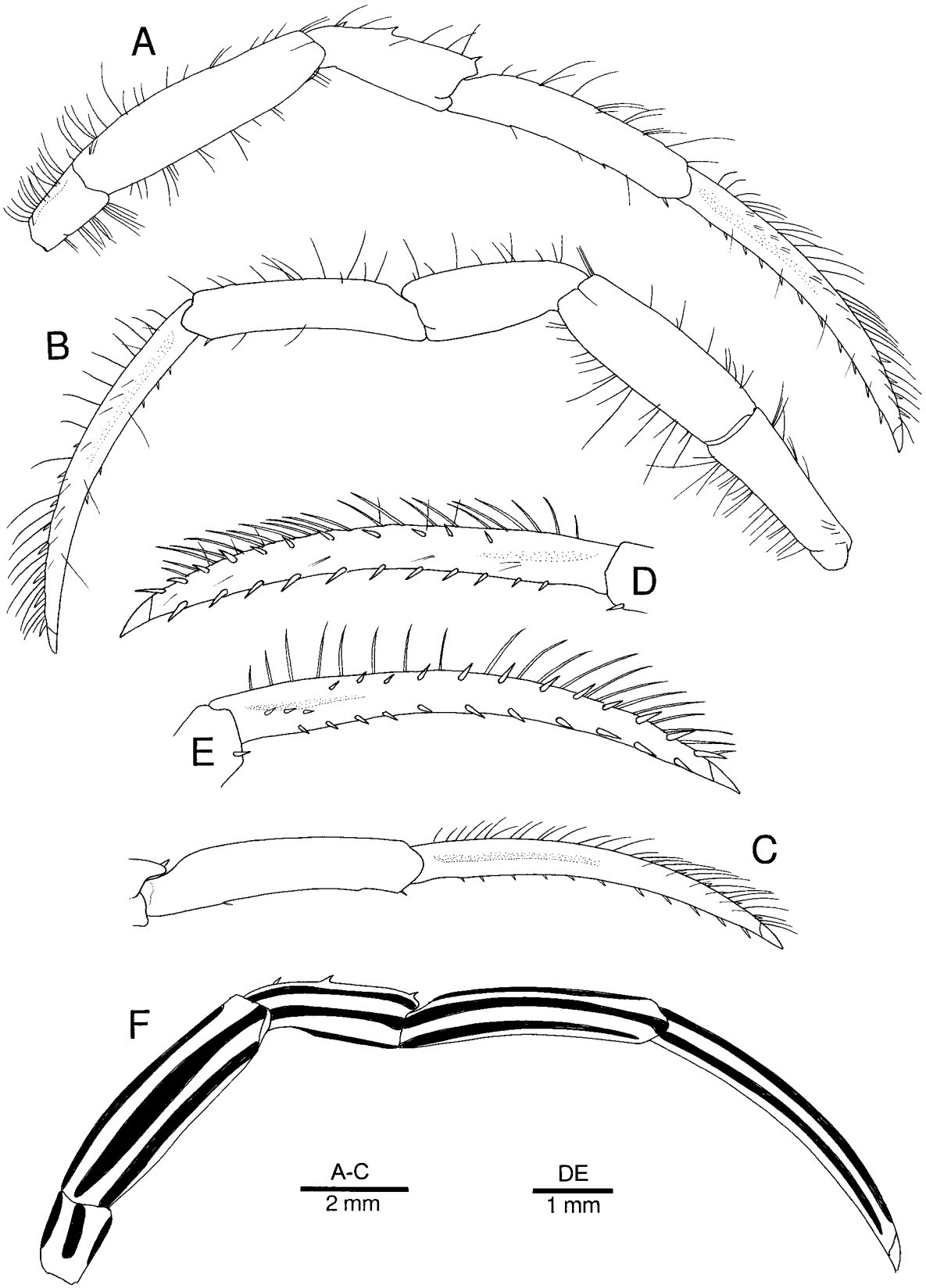


Fig. 5. *Pylopaguropsis vicina* sp. nov. Holotype, ovigerous female (sl 4.6 mm; CBM-ZC 6933). A, right second pereopod, lateral view; B, left third pereopod, lateral view; C, dactylus and propodus of right third pereopod, lateral view; D, dactylus of right second pereopod, mesial view; E, dactylus of left third pereopod, mesial view; F, semi-diagrammatic figure of right second pereopod in lateral view, showing color pattern (darkened stripes are actually orange red).

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personal observations). As for those species, *P. vicina* seems also to have a cryptic habit and to hide in the spaces between sponges or octocorals.

Etymology: From the Latin, *vicina* (= near), alluding to the strong similarity between the new species and *P. laevispinosa*.

Affinities: This new species is most similar to *P. laevispinosa*. The two differ from all other species of the genus except for *P. furusei* Asakura, 2000, in having a slightly oblique articulation of the semioperculate right chela and in possessing strongly spinose or tuberculate right and left chelae. *Pylopaguropsis vicina* sp. nov. can be distinguished from *P. laevispinosa* by differences in the armature of the chelae, setation of the dactyli of the ambulatory legs, and spination of the terminal margins of the telson. The dorsal armature of the palms of the chelae is composed of a mixture of small to moderately large tubercles and small blunt or subacute spines in the new species (Figs. 3A, B, 4A, B), while it includes only small to moderately small, rather acute spines in *P. laevispinosa* (Fig. 6A, B). Furthermore, many of the dorsal tubercles and spines on the right palm are naked in the new species, contrary to having tufts of short plumose setae arising from their bases in *P. laevispinosa* (Fig. 6C). Thus, the dorsal surface of the right palm of *P. laevispinosa* gives an expression that the palm is setose. The dorsal margins of the dactyli of the ambulatory legs are provided with a fine row of long bristles in *P. vicina* (Fig. 5D, E), rather than a sparse row of single setae or tufts of setae in *P. laevispinosa* (Fig. 6D). The terminal margin of the telson in the new species is armed only with 1 to 5 small spines or spinules (Fig. 1F), while that of *P. laevispinosa* has a row of numerous small spines (16 on the left, 12 on the right) extending onto the lateral margin (Fig. 6F). Color patterns in the two species also serve to facilitate identification. The rostrum and ocular acicles of the new species lacks accentuated margins, which are present in *P. laevispinosa*. The carpus of the left cheliped in the new species bears only a short orange stripe proximally on the dorsal face, while that of *P. laevispinosa* is distinctly orange-white striped on the dorsal, lateral and mesial faces. Both species have stripes on the ambulatory legs. However, in the new species, the dorsal orange stripe is on the dorsal surface proper, although it is visible in the lateral view (Fig. 5F), while it is present on the lateral face proper in *P. laevispinosa* (see Asakura, 2000, Fig. 10C, F). Thus, the dorsal surfaces of the propodi are white in *P. laevispinosa*.

Although the characters that Asakura (2000) proposed for the most part will distinguish *P. furusei* from *P. laevispinosa* and *P. vicina* sp. nov., we have found variations in some characters in the additional specimens of *P. furusei* that we have examined. The number of small corneous spines on the ventral surfaces of the propodi of the third pereopods is 4 to 7 (excluding a spine on the ventrodistal margin) in the two additional specimens of *P. furusei* at hand (1 female sl 4.3 mm, Nazumado, Hachijo-jima Island, Izu Islands, 45 m, 4 December 2000, coll. S. Kato, in the collection of Coastal Branch, Natural History Museum and Institute, Chiba, CMNH-ZC 634; 1 male sl 3.7 mm, Futami Bay, Chichi-jima Island, Ogasawara Islands, depth not recorded, 6 October 1997, coll. K. Nishikiori, NSMT-Cr 15197), although the spines are reportedly 8 to 14 in the type specimens (Asakura, 2000). Examination of more specimens may eventually reveal that the counts of the spines overlap between *P. furusei*, *P. laevispinosa* and *P. vicina*. Therefore, this character should be used with caution. Furthermore, the dorsal spines on the right palm of our female specimen are more numerous than those illustrated by Asakura (2000). In our two specimens, the merus of the right cheliped has small tubercles on the ventroproximal margin, although Asakura (2000) mentioned that the margin was unarmed in his specimens. Two additional characters seem to be useful in distinguishing *P. furusei* from *P. vicina* sp. nov. and *P. laevispinosa*. The ocular peduncles are 0.6–0.7 times as long as the shield in *P. furusei*, whereas 0.9–1.0 times as long in *P. vicina* and *P. laevispinosa*. The dactyli of the ambulatory legs are relatively shorter in *P. furusei* than in the other two species (1.1–1.3 times as long as the propodus versus 1.4–1.6 times as long in the second pereopod, and 1.3–1.4 times as long as the propodus versus 1.5–1.9 times as long in the third pereopod).

Remarks: Because of the strong similarity between the new species and *P. laevispinosa*, we reexamined the specimens referred to *P. laevispinosa* by McLaughlin (1997; four specimens from Indonesia, MNHN-Pg 5315, 5316) and Asakura (2000; one specimen from Kii Peninsula, Japan, initially assigned to *Pagurus zebra* by Miyake and Imafuku (1980), OMNH-Ar 2016). The four specimens from Indonesia are well consistent with the Japanese specimens of the new species in every morphological aspect and the pattern of the orange stripes on the chelipeds and ambulatory legs still preserved, except for the more widely variable number and shape of dorsal spines on the right palm. Therefore, these specimens are assigned to the new species.

The diagnostic characters of the new species are all possessed by the specimen from the Kii Peninsula used by Asakura (2000), although the color is completely faded away. This specimen is also referred to *P. vicina* sp. nov. with little hesitation.

***Pylopaguropsis laevispinosa* McLaughlin and Haig, 1989**
(Fig. 6)

Pylopaguropsis laevispinosa McLaughlin & Haig, 1989: 166, Figs. 2l, 4e, 6e, 8f, 10e, 12e, 13j; Asakura, 2000: 88 (part), Figs. 10 and 11.

Pylopaguropsis laevispinosa – McLaughlin, 1997: 544 (part). See “Remarks.”

Not Pylopaguropsis laevispinosa – McLaughlin, 1997, Fig. 30b, d, 44a-b.=*Pylopaguropsis vicina* sp. nov. See “Remarks.”

Material examined: Holotype. Station RFB-886, 1 km WNW of Onna Village, Okinawa Island, Ryukyu Islands, 26°30.0’N, 127°50.9’E, 3.0–12.2 m, 9 August 1981, coll. R. F. Bolland, ovigerous female (sl 4.1 mm) (USNM 231409).

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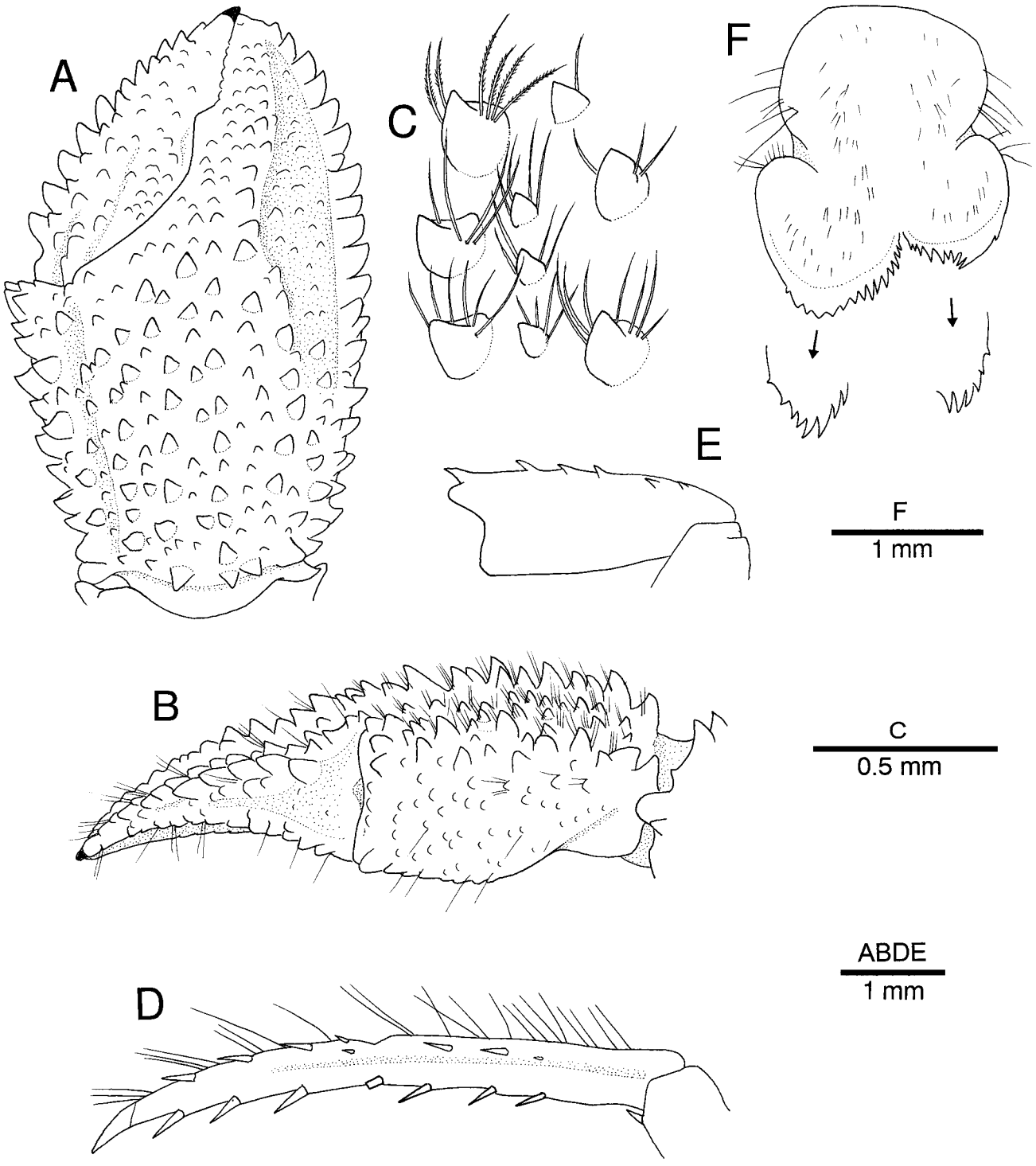


Fig. 6. *Pylopaguropsis laevispinosa* McLaughlin and Haig, 1989. Holotype, ovigerous female (sl 4.1 mm; USNM 231409). A, right chela, dorsal view (setae omitted); B, same, mesial view; C, spines on dorsal surface of palm of right chela, dorsal view; D, dactylus of right second pereopod, mesial view; E, telson, dorsal view; insets, posterolateral parts of posterior lobe, posterodorsal view.

Paratype. Station RFB-898, 1 km WNW of Onna Village, Okinawa Island, Ryukyu Islands, 26°30.0'N, 127°50.9'E, 70.1 m, 16 August 1981, coll. R. F. Bolland, female (sl 4.5 mm) (USNM 231410).

Supplemental description: Ocular peduncles 0.9 times as long as shield. Right chela (Fig. 6A, B) with numerous, small to moderately small, conical, subacute or acute spines on dorsal surface; dorsal spines frequently each with short plumose setae at base, making dorsal surface of palm setose (Fig. 6C); fixed finger with distinct longitudinal groove on dorsal surface extending onto distal part of palm. Left chela with 2 irregular longitudinal rows of small, acute or subacute

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spines on midline of dorsal surface, 1 extending onto fixed finger; dorsal spines frequently each with short plumose setae at base. Dactyli of second and third pereopods (Fig. 6D) each with row of sparse, short to moderately long setae on dorsal margin; ventral margins each with 7–11 corneous spines; carpi each with 3-5 small dorsomesial spines in second (Fig. 6E) or with only 1 or 2 proximal dorsomesial spinules in third, in addition to strong dorsodistal spine. Terminal margins of telson (Fig. 6F) with 16 small spines on left (including 5 spines extending onto lateral margin) and 12 spines on right (including 3 spines extending onto lateral margin).

Remarks: Neither McLaughlin and Haig (1989) nor Asakura (2000) mentioned or illustrated the distinct longitudinal groove on the dorsal surface of the fixed finger of the right chela in the type specimens of *P. laevispinosa*. Initial comparison with the descriptions and figures of McLaughlin and Haig (1989) and Asakura (2000) led the present authors to suspect that this character might be significant in distinguishing *P. vicina* sp. nov. from *P. laevispinosa*. However, reexamination of the type specimens has shown that the dorsal surface of the fixed finger of the right chela is actually grooved in *P. laevispinosa* as in the new species. The short plumose setae which arise at the bases of the dorsal spines on the chelae were not mentioned by the previous authors. This character is useful in distinguishing *P. laevispinosa* from *P. vicina*. The counts of spines on the ambulatory propodi and dactyli, and of the terminal margins of the telson have not been specified by the previous authors. It has been found that there are 4 to 6 spines including a distal strong spine on the dorsal surfaces of the carpi of the second pereopods. McLaughlin and Haig (1989) stated that the terminal margins of the telson were armed with a row of small spines extending onto the lateral margins. There are actually 16 spines (left) and 12 spines (right) on the terminal margins of the telson in the holotype. The telson is now missing from the paratype.

As discussed before, four of the five specimens referred to *Pylopaguropsis laevispinosa* by McLaughlin (1997) proved to represent *P. vicina* sp. nov. The fifth specimen, ovigerous female deposited in the collection of the Research Center for Oceanography, Indonesian Institute of Sciences (LIPI), was not reexamined. In her diagnosis of *P. laevispinosa*, McLaughlin (1997) stated that the terminal margins of the telson are armed each with a few to several small spines, sometimes extending onto the lateral margins, particularly on the left. Therefore, McLaughlin's (1997) account is referred to *P. laevispinosa* in part. Dr. P. A. McLaughlin (personal communication) suggested that the specimen in the LIPI collection might represent the same species as the other four specimens.

Distribution: So far known only from Okinawa Island, Ryukyus, Japan, at depths of 3-70.1 m.

EMENDED KEY TO SPECIES OF *PYLOPAGUROPSIS*

Since McLaughlin and Haig's (1989) revision of the genus, two new species have been added by Asakura (2000) and a new species is described in this paper. Asakura (2000) proposed a key to species occurring in Japanese waters. We here emend a key provided by McLaughlin and Haig (1989) to include the species described since its publication.

1 Palm of right chela fringed with dense long seta .... *P. fimbriata* McLaughlin and Haig, 1989

1 Palm of right chela not fringed with long setae 2

2 Left chela with 1 or more rows of spines on dorsal surface 3

2 Left chela unarmed or with few scattered spinules or spinulose tubercles on dorsal surface 8

3 Propodal rasp of fourth pereopod usually with 1 (rarely 2) row of corneous scales 4

3 Propodal rasp of fourth pereopod with 2–4 rows of corneous scales 7

4 Right chela operculate with strongly oblique articulation of dactylus, surfaces covered with small granules, dorsolateral margin not delimited; dactylus of left chela unarmed .... *P. granulata* Asakura, 2000

4 Right chela semioperculate with slightly oblique articulation of dactylus, dorsal surfaces with small to moderately large spines or tubercles, dorsolateral margin distinctly delimited, with row of spines; dactylus of left chela armed with rows of spines 5

5 Ocular peduncles 0.6–0.7 times as long as shield; dactyli of second and third pereopods 1.1–1.4 times as long as propodi; propodi of third pereopods each with 5–15 corneous spines on ventral surface .... *P. furusei* Asakura, 2000

5 Ocular peduncles 0.9–1.0 times as long as shield; dactyli of second and third pereopods 1.4–1.9 times as long as propodi; propodi of third pereopods each with 1–3 corneous spines on ventral surface 6

6 Many of dorsal spines on palm of right chela each with tuft of short plumose setae at base; dactyli of second and third pereopods each with sparse, single setae or tufts of setae on dorsal margin; terminal margins of telson each with 12–16 spines extending onto lateral margin .... *P. laevispinosa* McLaughlin & Haig, 1989

6 None of dorsal spines or tubercles on palm of right chela with tuft of short plumose setae; dactyli of second and third pereopod each with row of long bristles on dorsal margin; terminal margins of telson with 1–5 small spines not extending onto lateral margin ..... *P. vicina* sp. nov.

7 Carpus of right cheliped with dorsolateral surface weakly armed, margin upturned; telson with terminal margins concave ..... *P. atlantica* Wass, 1963

7 Carpus of right cheliped with dorsolateral surface moderately to strongly armed, margin not upturned; telson with terminal margins oblique ..... *P. magnimanus* Alcock, 1905

8 Dactylus of right third pereopod appreciably broader

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than left; anterior lobe of sixth thoracic sternite subrectangular or oblong 9
8 Dactylus of right third pereopod not appreciably broader than left; anterior lobe of sixth thoracic sternite subtriangular or rounded 12
9 Propodus of right third pereopod with 1 longitudinal sulcus on lateral face 10
9 Propodus of right third pereopod with 2 or 3 longitudinal sulci on lateral face 11
10 Ocular peduncles appreciably broader proximally than at base of corneas; carpus of left cheliped with 1 or 2 rows of spines on dorsal surface; propodus of right third pereopod with sulcus on lateral face not delimited by broad, flattened median ridge..... *P. keijii* McLaughlin and Haig, 1989
10 Ocular peduncles not appreciably broader proximally than at base of corneas; carpus of left cheliped only with 1–3 spines on dorsal surface distally; propodus of right third pereopod with sulcus on lateral face delimited by broad, flattened median ridge ..... *P. zebra* (Henderson, 1893)
11 Dactylus of right chela with closely-spaced, low, flattened tubercles on dorsal surface, dorsomesial margin with plate-like tubercles; merus of left cheliped with prominent tubercle at ventromesial proximal angle ....*P. speciosa* McLaughlin and Haig, 1989
11 Dactylus of right chela with scattered, small, spinulose tubercles, dorsomesial margin with row of acute spines; merus of left cheliped with row of spines on ventromesial margin ..... *P. lewinsohni* McLaughlin and Haig, 1989
12 Propodus of right third pereopod with lateral face flattened; propodal rasp of fourth pereopod with 2 rows of corneous scales .....*P. pustulosa* McLaughlin and Haig, 1989
12 Propodus of right third pereopod with lateral face convex; propodal rasp of fourth pereopod with 1 partial row of corneous scales 13
13 Right chela with mesial face strongly produced ventrally in proximal half, ventral surface strongly excavated in lateral half; dactylus of right third pereopod with longitudinal sulcus .....*P. teevana* (Boone, 1932)
13 Right chela with mesial face not strongly produced ventrally in proximal half, ventral surface not strongly excavated in lateral half; dactylus of right third pereopod without longitudinal sulcus..... *P. garciai* McLaughlin & Haig, 1989

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