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A new species of the deepwater pandalid shrimp of the genus *Pandalopsis* (Crustacea: Decapoda: Pandalidae) from the Kuril Islands, North Pacific

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***Abstract.*—A new species of the pandalid shrimp genus *Pandalopsis* is reported from the Kuril Islands. *Pandalopsis spinosior* new species is closely related to *P. miyakei* Hayashi, 1986, particularly in the rostral formula and the spine arrangement of the ambulatory legs. However, the new species is immediately distinguished from the latter by having the anteriormost spine of the dorsal rostral series (except subapical ones) situated anterior to the antennular peduncle, the pleuron of the fourth abdominal somite with a posteroventral spine and the telson armed with a greater number of dorsolateral spines.**

Introduction

The pandalid shrimp genus *Pandalopsis* contains 15 species (Komai, 1994; Jensen, 1998). Species of *Pandalopsis* are primarily members of the North Pacific faunal community, except for one species, *P. ampla* Bate, 1888, which occurs both in the eastern Pacific and the western South Atlantic (Takeda & Hatanaka, 1984; Komai, 1994). Due to their large body size and abundance, *Pandalopsis* includes some species of particular interest for commercial fisheries (Holthuis, 1980). Since Bate (1988), various authors have undertaken taxonomic studies of *Pandalopsis*. The following studies are significant: Rathbun (1904), Kobjakova (1936), Urita (1941), Boschi (1973), Butler (1980), Hayashi (1986), Komai & Amaoka (1989), Komai (1994, 1997), and Jensen (1998). Despite these contributions, there still remains some uncertainty and more studies on this genus are required (Komai, 1994).

Recently, several shrimps, collected in the Kuril Islands and subsequently landed at a local fishery port in Aomori Prefecture, were sent to the authors for identification. Our study revealed that they belong to an unknown species of *Pandalopsis* and are described here as a new species, *P. spinosior*.

Abbreviations used are: cl, postorbital carapace length; NSK, Nansei National Fisheries Research Institute at Kochi (now Kuroshio Station, National Fisheries Research Institute of Fisheries Science); NSMT, National Science Museum, Tokyo.

Systematic account

Pandalopsis spinosior new species

Figs. 1–3

Material.—Holotype: ovigerous female (cl 36.4 mm); definite data unknown but collected in the Urup (or Etorofu) Strait by a Japanese fishery vessel at depths around 400 m with an otter trawl during the period from August 1999 to February 2000 (NSMT).

Paratypes: 3 transitional males (cl 35.0–36.2 mm), 3 females (cl 36.0–37.8 mm), 3 ovigerous females (cl 34.5–35.8 mm) (NSMT). Data same as for the holotype.

Description.—Body moderately robust, naked (Fig. 1).

Rostrum (Fig. 1) distinctly exceeding beyond distal margin of antennal scale, 1.19–1.35 (average 1.28) times as long as

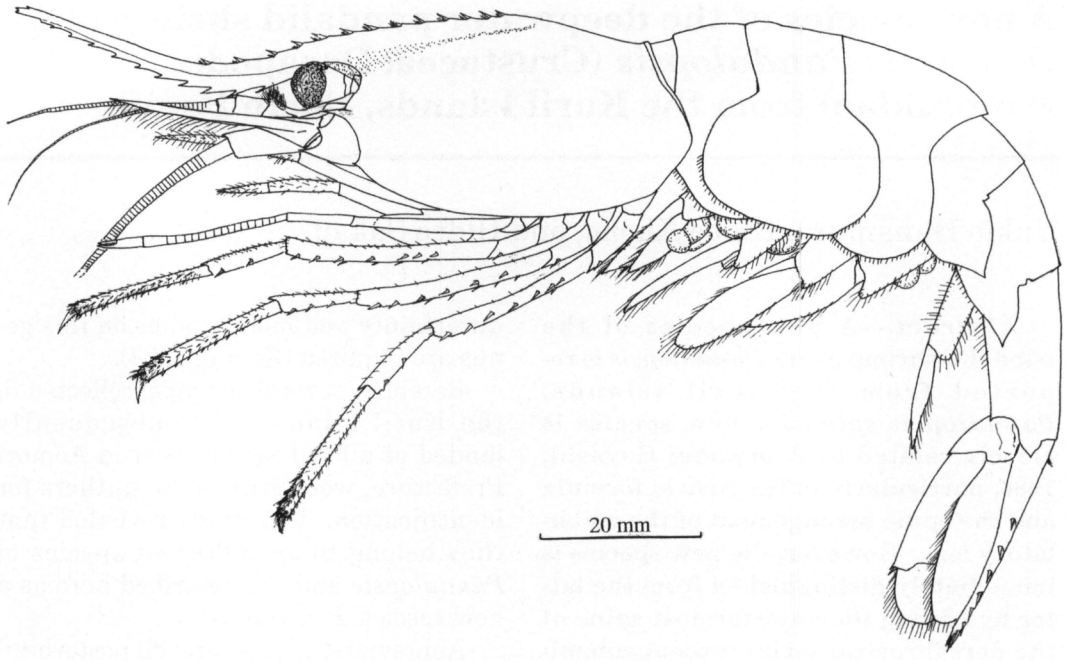

Fig. 1. *Pandalopsis spinosior* new species, holotype ovigerous female, cl 36.4 mm.

carapace, curving dorsad, armed dorsally with 13–16 spines, including usually 6–8, infrequently 5, spines situated on carapace, posteriormost spine placed at midlength of carapace, anteriormost spine placed anterior to distal end of antennular peduncle, unarmed in distal half except for 2 fixed subapical spines; ventral margin armed with 10–12 spines for entire length, posteriormost spine slightly smaller than preceding one; lateral carina well developed throughout entire length.

Carapace (Fig. 1) smooth, branchial ridge indistinct, postrostral carina moderately high, running to posterior two-fifths, then rounded posteriorly except for weak tubercule but no transverse setal tufts near posterodorsal margin; antennal spine stout, reaching base of cornea; branchiostegal spine small; pterygostomian corner broadly rounded.

Abdomen (Fig. 1) rounded dorsally, 6th somite 1.72–1.89 (average 1.84) times as long as 5th. Pleura of first 3 somites broadly rounded, those of 4th and 5th somites normally with posteroventral spine, but infrequently rounded on either side.

Telson (Figs. 1, 2a) dorsally flattened or feebly rounded, 0.76–0.80 (average 0.78) times as long as carapace, 1.38–1.43 (average 1.40) times as long as 6th abdominal somite, armed with 7 or 8 dorsolateral spines on each side in addition to terminal 3 pairs, with dorsal tuft of setae at anterior dorsal surface. Uropod (Figs. 1, 2a) reaching as far as end of telson; exopod slightly longer than endopod, with movable spine at just mesial to lateral spine.

Eye (Fig. 2d) broadly subpyriform, cornea well developed, maximal diameter about 0.2 times as long as carapace, ocellus in contact with cornea, small.

Antennular peduncle (Fig. 2b) with 1st segment slightly more than 1.5 times as long as length of 2nd and 3rd segments combined, stylocerite short, broadly rounded distally; outer flagellum not in-

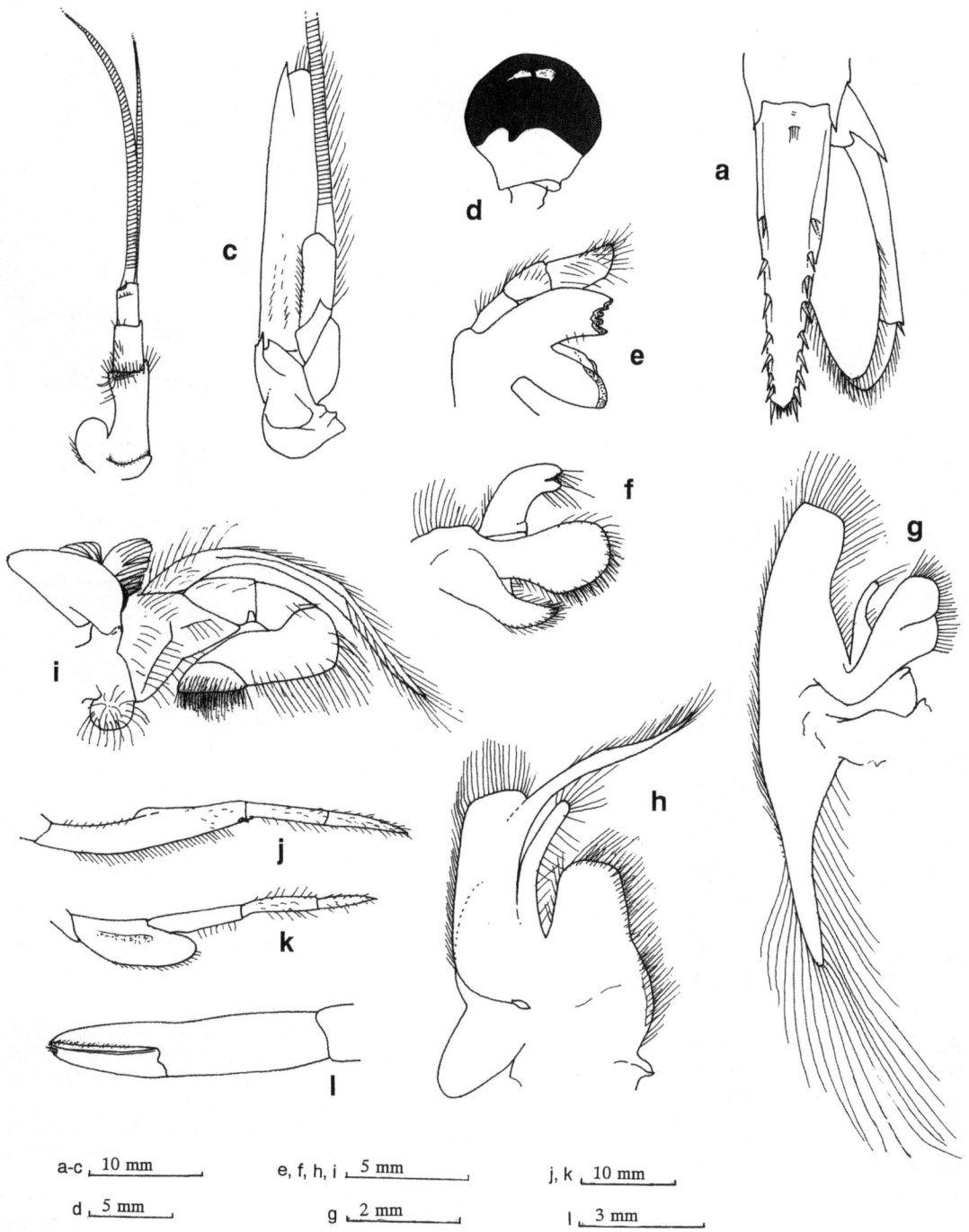

Fig. 2. *Pandalopsis spinosior* new species, holotype ovigerous female, cl 36.4 mm (a, d–l) and paratype female, cl 37.8 mm (b, c): a, tail fan; b, left eye, dorsal aspect; c, left 1st antenna, dorsal aspect; d, left 2nd antenna, ventral aspect; e, right mandible; f, right 1st maxilla; g, right 2nd maxilla; h, right 1st maxilliped; i, right 2nd maxilliped; j, right 3rd maxilliped; k, right 1st pereopod; l, left chela of 2nd pereopod.

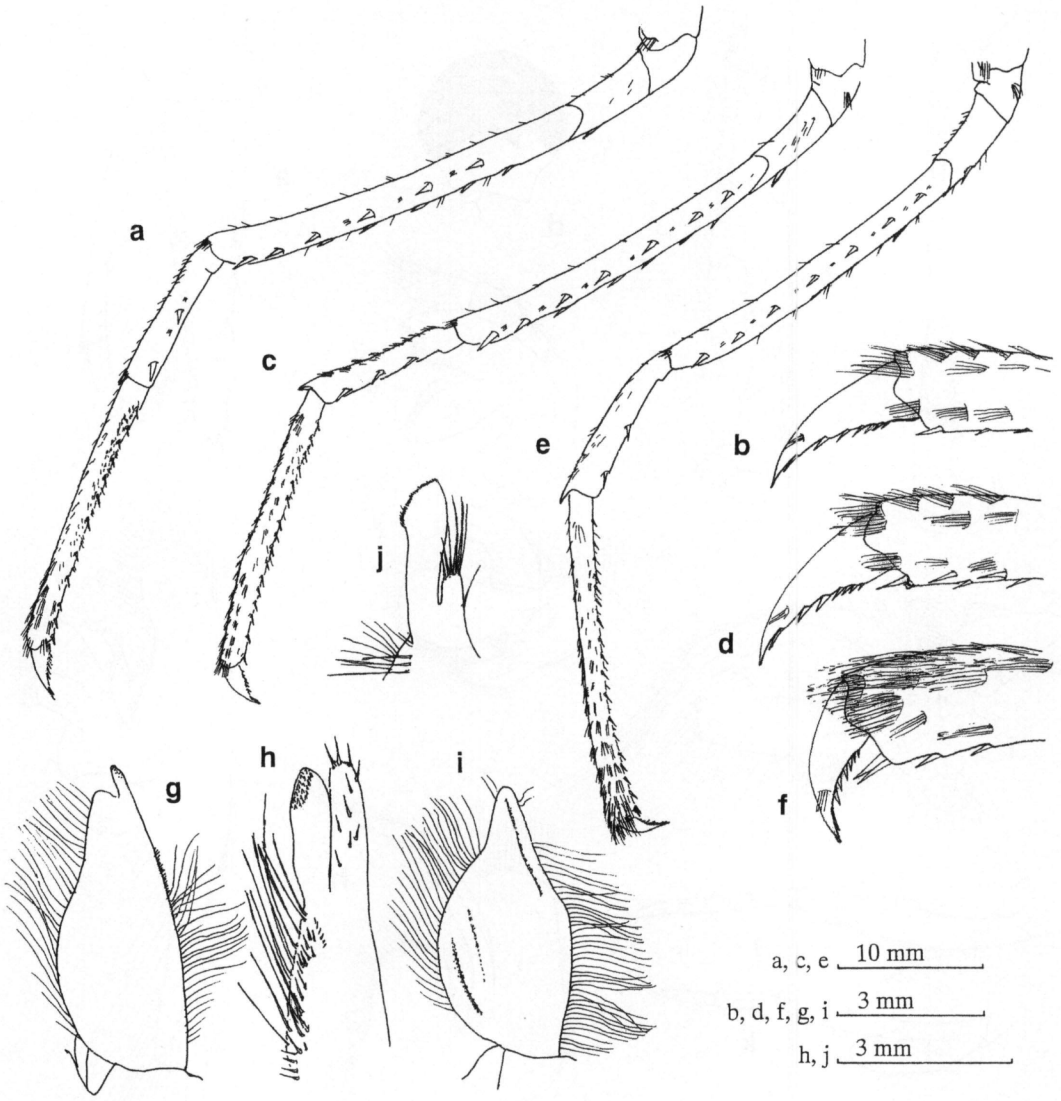

Fig. 3. *Pandalopsis spinosior* new species, holotype ovigerous female, cl 36.4 mm (a–f), paratype transitional male, cl 36.2 mm (g, h), and paratype ovigerous female, cl 34.5 mm (i, j): a, left 3rd pereopod; b, same, dactylus enlarged; c, left 4th pereopod; d, same, dactylus enlarged; e, left 5th pereopod; f, same, dactylus enlarged; g, right endopod of 1st pleopod of transitional male; h, right appendix interna and appendix masculina of transitional male; i, right endopod of 1st pleopod of ovigerous female; j, right appendix interna and reduced appendix masculina of ovigerous female.

tact in any specimens, basal thickened aesthetasc-bearing portion slightly more than 0.6 times as long as carapace.

Antennal scale (Fig. 2c) 0.71–0.78 (average 0.74) times as long as carapace, 3.44–3.90 (average 3.62) times as long as wide, distolateral spine extending slightly beyond distal margin of lamella, lateral margin nearly straight. Flagellum as long as entire body length.

Mouthparts (Fig. 2e-i) typical of genus. Third maxilliped (Fig. 2j) falling short of distal margin of antennal scale, distal segment 1.05–1.22 (average 1.12) times as long as penultimate.

First pereopod (Figs. 1, 2k) reaching

midlength of antennal scale, propodus 0.78–0.86 (average 0.81) times as long as carpus; ischium with braod laminar expansion. Second pereopods (Figs. 1, 2l) subequal, extending beyond antennal scale by length of fingers and sometimes slightly more than distal part of propodus, 16–19 (frequently 17 or 18) carpal articles; fingers 0.60–0.75 (average 0.67) times as long as palm. Third pereopod (Figs. 1, 3a, b) extending beyond antennal scale by length of dactylus and slightly more than distal one-fourth of propodus; dactylus 0.20–0.24 (average 0.22) times as long as propodus, armed with 5–7 (frequently 6) ventral spinules on proximal two-thirds in addition to subapical spinule; propodus with numerous scattered tufts of setae (becoming more dense distally) and spinules on lateral and ventral margins; carpus armed with 2 or 3 lateral spines, with numerous short setae and scattered spinules on dorsal surface; merus armed with 5–10 (frequently 7 or 8) lateral and 5–7 (frequently 6 or 7) ventral spines, with several short setae along dorsal margin; ischium with ventral spine. Fourth pereopod (Figs. 1, 3c, d) similar to 3rd, extending beyond distal margin of antennal scale by length of dactylus; dactylus 0.18–0.21 (average 0.20) times as long as propodus, armed normally with 5 or 6 (frequently 6) spinules on proximal two-thirds in addition to subapical spinule; propodus with numerous scattered tufts of setae (becoming more dense distally) and spinules on lateral and ventral margins; carpus armed with 2 or 3 lateral spines, many short setae and scattered spinules on dorsal margin (slightly less setulose than 3rd); merus armed with 6–8 (frequently 7) lateral and 5–7 (frequently 6) ventral spines, with some short setae on dorsal margin; ischium with ventral spine. Fifth pereopod (Figs. 1, 3e, f) reaching as far as distal margin of antennal scale; dactylus 0.13–0.19 (average 0.16) times as long as propodus, armed with 6–8 (frequently 6) ventral spinules on proximal two-thirds in addition to subapical spinule; propodus with numerous scattered tufts of setae (becoming more dense distally) and spinules on lateral and ventral margins; carpus armed with 2 or 3 lateral spines, with short setae and spinules on dorsal margin (less setulose than 4th); merus armed with 6–9 (frequently 7) lateral and 0–7 ventral spines, with some short setae on dorsal margin.

Epipods on first 4 pereopods and branchial arrangement as in genus (cf. Boschi, 1973; Komai, 1994).

Endopod of 1st pleopod in transitional male bilobed, distomesial lobule long and narrow (Fig. 3g). In females, endopod abruptly narrowing distally (Fig. 3i). Appendix masculina in transitional males as long as or slightly shorter than appendix interna, distal bristles reduced (Fig. 3h). In females, appendix masculina considerably reduced in size, half length of appendix interna, armed with several setae distally (Fig. 3i). Third pleopod with exopod about half length of carapace.

Egg.—Non-eyed eggs oval, 3.6–3.8 x 2.6–2.7 mm.

Colour.—Carapace mottled with large light red patches and abdomen with transverse light red stripes basically at posterior part of each somite. Appendages generally light red (based on frozen specimens).

Etymology.—The Latin "*spinosior*" refers to a greater number of telson spines compared with the closest relative *P. miyakei*.

Distribution.—The definite sample site is unknown, but the specimens examined in this study were captured by a deep sea otter trawl operated at depths around 400 m in the waters between the Etorofu (Iturup) and Urup Islands (Urup or Etorofu Strait) in the Kuril Islands. *Pandalopsis spinosior* co-occurs with a bighand thornyhead, *Sebastolobus macrochir* (Günter). The Japanese trawling vessels operate in that region, target-

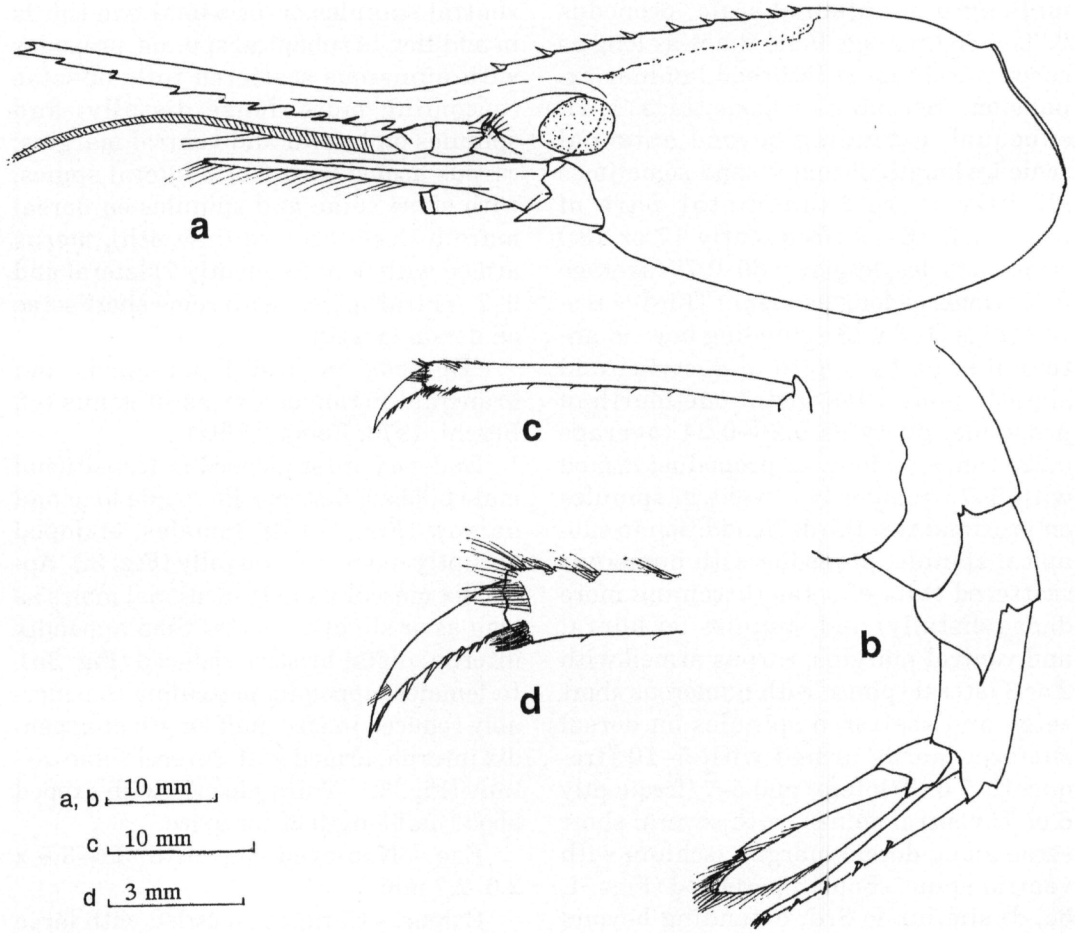

Fig. 4. *Pandalopsis miyakei* Hayashi, 1986, female from Tosa Bay, cl 37.0 mm (NSK Dec 00027): a, anterior part of body; b, posterior part of body; c, left dactylus and propodus of 5th pereopod; d, same, dactylus enlarged.

ing mainly this fish.

Remarks.—Komai (1994) suggested the identity of *Pandalopsis profunda* Zarenkov, 1971, to be an immature of *P. miyakei*, but confirmation demands future studies. Hence, the genus *Pandalopsis* contains 15 recognized species to date. The identification key provided by Komai (1994, 1997) is useful in the recognition of the species of *Pandalopsis* by the addition of *P. lucidirimicola* Jensen, 1998, a recently desribed species from the eastern Pacific.

Of the known species of *Pandalopsis*, the new species shows the closest affinity to *P. miyakei* in having a combination of the following features: the carapace is naked; the rostrum is unarmed, at least in distal half of the dorsal margin, with usually six or more postorbital spines (one specimen of *P. spinosior* possesses five spines); the proximalmost spine of the ventral rostral series is subequal to the length of the second spine; the outer flagellum of the first antenna has a basal aesthetasc-bearing portion consistently shorter than the carapace; and the dactyli of the posterior three pereopods are armed with ventral spinules on almost its entire length.

Comparison with five specimens of *P. miyakei*, collected in Tosa Bay off the Pacific coast of south-west Japan (NSK Dec 00027; Fig. 4), revealed following differences. The anteriormost dorsal rostral spine (except the subapical group) is situated anterior to the distal margin of the antennular peduncle while it arises above the antennular peduncle in *P. miyakei*; the lateral carina of the rostrum is sharp, extending to near apex of the rostrum in *P. spinosior* rather than an obtusely rounded carina reaching at most the midlength in *P. miyakei*. The pleuron of the fourth abdominal somite of the new species normally possesses a posteroventral spine instead of usually having no spine in *P. miyakei*. The propodi of the posterior three pereopods are more heavily setose than in *P. miyakei*. The telson bears seven or eight dorsolateral spines rather than five spines on each margin, in addition to ordinary three terminal pairs in *P. miyakei*. The colour is also different, in that the entire body of *P. miyakei* is wine red or purplish (Hayashi, 1986; photo on p. 122) in contrast to light reddish in the new species.

The occurrence of a transitional phase in the appendix masculina implies that *Pandalopsis spinosior* is possibly a protandous hermaphroditic species as in other members of the genus (cf. Komai, 1994).

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