

***Periclimenes dardanicola* n. sp.,  
a new species of hermit crab associated shrimp  
(Crustacea, Decapoda, Palaemonidae)  
from the western Pacific**

**Alexander J. BRUCE**

Queensland Museum, P. O. Box 3300,  
South Brisbane, Queensland, 4101 (Australia)  
abruce@broad.net.au

**Junji OKUNO**

Coastal Branch of Natural History Museum and Institute, Chiba,  
123 Yoshio, Katsuura, Chiba 299-5242 (Japan)  
okuno@chiba-muse.or.jp

Bruce A. J. & Okuno J. 2006. — *Periclimenes dardanicola* n. sp., a new species of hermit crab associated shrimp (Crustacea, Decapoda, Palaemonidae) from the western Pacific. *Zoosystema* 28 (2): 367-377.

**KEY WORDS**

Crustacea,  
Decapoda,  
Caridea,  
Palaemonidae,  
Pontoniinae,  
hermit crab associate,  
*Periclimenes dardanicola*,  
western Pacific,  
new species.

**ABSTRACT**

A new species of pontoniine shrimp, *Periclimenes dardanicola* n. sp., is described and illustrated on the basis of six specimens from Japan, Vietnam, and Indonesia. The new species is associated with *Calliactis* Verrill, 1869 sea anemones carried by hermit crabs of the genus *Dardanus* Paulson, 1875. Morphologically, the new species appears closest to *P. parvus* Borradaile, 1898 but is distinguished from the latter by the form of inferior orbital and pterygostomial angles of the carapace, the first pereopod with the dactylus shorter than the palm, and the carpus subequal or slightly longer than the chela.

**RÉSUMÉ**

*Periclimenes dardanicola* n. sp., une nouvelle espèce de crevette (Crustacea, Decapoda, Palaemonidae) en provenance de l'Ouest-Pacifique, associée à un bernard-l'ermite.

Une nouvelle espèce de crevette Pontoniinae, *Periclimenes dardanicola* n. sp., est décrite et illustrée en se basant sur six spécimens provenant du Japon, du Vietnam et de l'Indonésie. Cette espèce est associée à des anémones de mer du genre *Calliactis* Verrill, 1869, elles-mêmes associées à des bernard-l'ermite du genre *Dardanus* Paulson, 1875. Morphologiquement, la nouvelle espèce semble très proche de *P. parvus* Borradaile, 1898, mais s'en distingue par la forme des angles inféro-orbitaires et ptérygostomiens de la carapace, et par les premiers péréopodes dont le dactylus est plus court que la paume et le carpus subégal ou légèrement plus long que la pince.

**MOTS CLÉS**

Crustacea,  
Decapoda,  
Caridea,  
Palaemonidae,  
Pontoniinae,  
associé à des pagures,  
*Periclimenes dardanicola*,  
Ouest-Pacifique,  
espèce nouvelle.

## INTRODUCTION

Borradaile (1898) described a new species of *Periclimenes* Costa, 1844, *P. parvus*, based on two specimens from Rakaiya, Blanche Bay, New Britain, Papua New Guinea. The original description was rather brief, and the illustration provided by the original author (Borradaile 1899) was somewhat inaccurate. Holthuis (1952) reported an additional specimen of *P. parvus* in his large monograph on the pontoniine shrimps from Indonesian waters. The senior author compared two syntypes of *P. parvus* with Holthuis' specimen, and considered that the Indonesian individual is closely related to *P. parvus* but belonging to an undescribed species. The possibility that the Indonesian individual was distinct from *P. parvus* was reported by Chace & Bruce (1993) who excluded this species from their key to the Philippine-Indonesian species of *Periclimenes*.

One of us (JO) examined one male and two females of a behaviorally interesting, undescribed species of pontoniine shrimp collected from Suruga Bay, Honshu, Japan. This species is associated with the *Calliactis* Verrill, 1869 sea anemones present on the gastropod shells occupied by the *Dardanus* Paulson, 1875 hermit crabs, and has been reported in the popular publications accompanied with beautiful underwater photographs (Takeda 1986; Debelius 1999; Minemizu 2000). From initial comparison with the literature, JO recognized that the species from Suruga Bay morphologically agreed well with *P. parvus* sensu Holthuis (1952). During the course of this study, specimens of the same species captured from the coast of Vietnam were kindly made available to AJB by Ivan Marin. We herein describe this new species, and include a comparison with the syntypes of the closely allied *P. parvus*.

## MATERIAL AND METHODS

Specimens from Japan and Vietnam were recently collected from the sublittoral zone using scuba equipment. The illustrations were made with the aid of a drawing tube mounted on a stereomicroscope. The postorbital carapace length is abbreviated as CL. The specimens examined are deposited in the

following museums: Coastal Branch of Natural History Museum and Institute, Chiba (CMNH); Queensland Museum, Brisbane (QM); University Museum of Zoology, University of Cambridge (UMZC); and Zoological Museum, University of Amsterdam (ZMA).

## SYSTEMATICS

Family PALAEMONIDAE Rafinesque, 1815  
Subfamily PONTONIINAE Kingsley, 1878

*Periclimenes dardanicola* n. sp.  
(Figs 1–4)

*Periclimenes* (*Periclimenes*) *parvus* – Holthuis 1952: 40, figs 9, 10. Not *Periclimenes parvus* Borradaile, 1898.

*Periclimenes parvus* – Bruce 1977: 3 (in part). — Li 2000: 221, fig. 288 (in part). — Bruce 2003: 239 (in part).

*Periclimenes soror* – Takeda 1986: 116, unnumbered fig. in colour. Not *Periclimenes soror* Nobili, 1904.

*Periclimenes imperator* – Debelius 1999: 235, unnumbered fig. in colour. Not *Periclimenes imperator* Bruce, 1967.

Pontoniinae sp. – Minemizu 2000: 58, unnumbered figs in colour.

TYPE MATERIAL. — Holotype: **Japan**. Kuryo, Numazu, Izu Peninsula, Suruga Bay, Honshu, 35°01.2'N, 138°49.9'E, 21 m, scuba, associated with *Calliactis japonica* (Carlgren, 1928) (Actiniaria, Hormathiidae) on *Tonna luteostoma* (Kuster, 1857) (Discopoda, Tonnidae) occupied by *Dardanus crassimanus* (H. Milne Edwards, 1836) (Anomura, Diogenidae), 28.II.2000, coll. R. Minemizu, ♂ 2.2 mm CL (CMNH-ZC 01894).

Paratypes: **Japan**. Ose-zaki, Numazu, Izu Peninsula, Suruga Bay, Honshu, 35°01.6'N, 138°47.2'E, 5 m, scuba, associated with *Calliactis japonica* on *Charonia lampas sauliae* (Reeve, 1844) (Discopoda, Ranellidae) occupied by *Dardanus arrosor* (Herbst, 1796) (Anomura, Diogenidae), 22.I.2004, coll. T. Yanagisawa, 1 ♀ 2.4 mm CL (QM W 27972). — Off Enashi, Nishiura, Numazu, Izu Peninsula, Suruga Bay, Honshu, 35°01.2'N, 138°48.8'E, 12 m, scuba, associated with sea anemone on gastropod shells occupied by *Dardanus* sp., 13.IV.2005, coll. H. Watanabe, 1 ♀ 3.6 mm CL (CMNH-ZC 01895).

**Indonesia**. *Siboga*, stn 79b, Kabala dua Island, Borneo Bank, 22 m, 12–13.VI.1899, 1 ♂ (ZMA De.201484).

**Vietnam**. Tre Island, Nha Trang Bay, Vietnam, 25 m, scuba, in gastropod shells (*Cassis* sp.) occupied by *Dardanus*

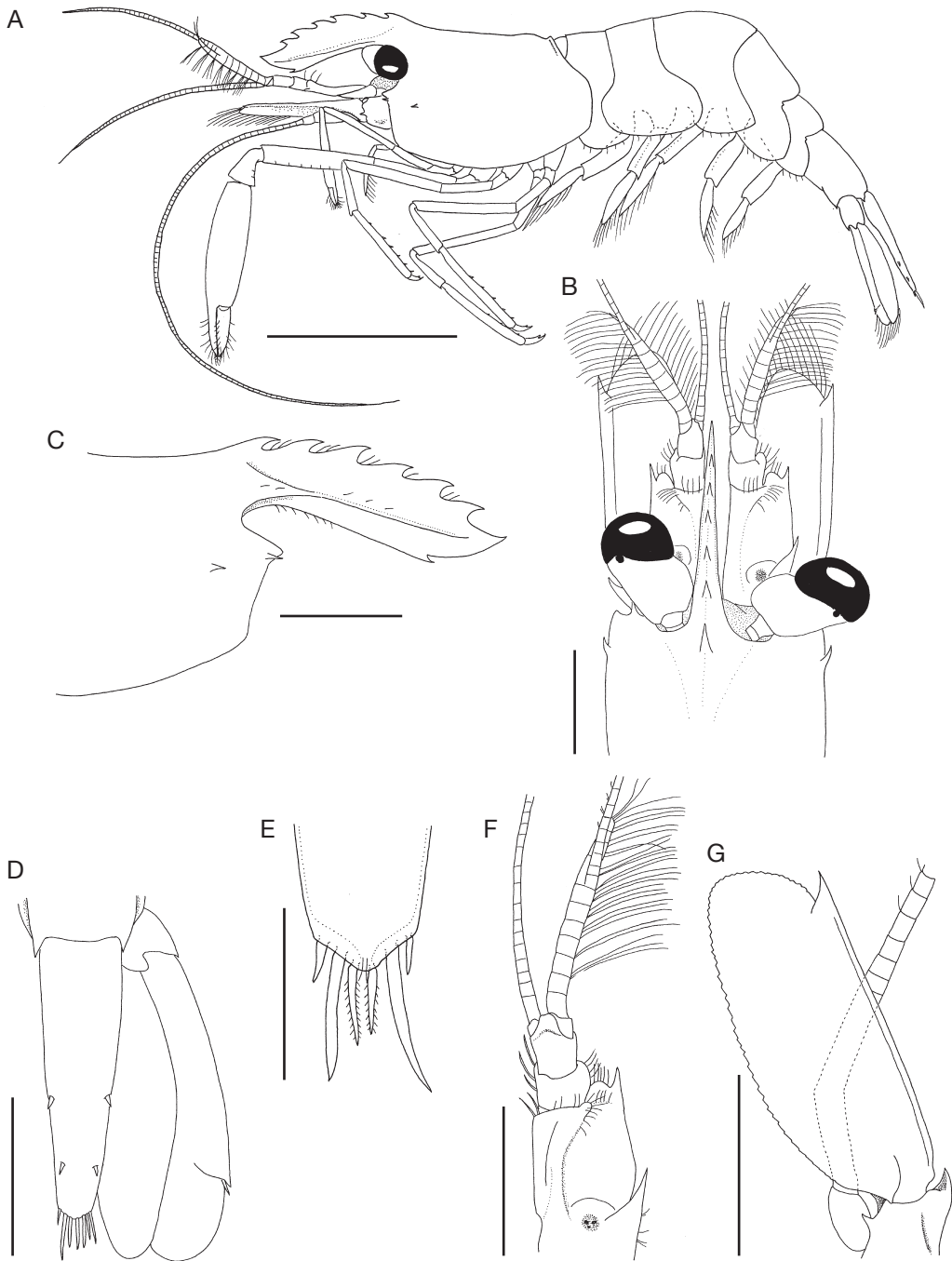


FIG. 1. — *Periclimenes dardanicola* n. sp.: **A-D, F, G**, holotype ♂ (CMNH-ZC 01894); **E**, paratype ♀ (CMNH-ZC 01895); **A**, entire animal, lateral; **B**, anterior part of carapace, rostrum and cephalic appendages, dorsal; **C**, anterior part of carapace and rostrum, lateral; **D**, telson and right uropod (marginal setae omitted), dorsal; **E**, posterior part of telson, dorsal; **F**, right antennular peduncle, dorsal; **G**, right antenna (marginal setae omitted), dorsal. Scale bars: A, 3.0 mm; B-D, F, G, 1.0 mm; E, 0.5 mm.

*lagopodes* (Forskål, 1775) (Anomura, Diogenidae), without sea anemones, 30.VI.2004, coll. I. Marin, 1 ♂ 3.7 mm CL; 1 ovig. ♀ 4.0 mm CL (QM W 27971).

**ETYMOLOGY.** — The specific name is a combination of *Dardanus*, the generic name of hermit crab of the family Diogenidae, and the Latin *cola* (dweller), in reference to the association of the new species.

**DISTRIBUTION.** — Suruga Bay, Honshu, Japan; Vietnam; Borneo, Indonesia.

#### DESCRIPTION

A small-sized, moderately robust pontoniine shrimp with subcylindrical body form (Fig. 1A).

Carapace (Fig. 1A, C) smooth, glabrous; supra-orbital spine absent; orbit feebly developed, inferior orbital angle distinctly produced, tapering distally; antennal spine small, acute, marginal, subequal to level of tip of inferior orbital angle; hepatic spine small, distinctly ventral to level of antennal spine, slightly posterior to level of most proximal rostral dorsal tooth; pterygostomial margin not produced, bluntly angular.

Rostrum (Fig. 1B, C) well developed, 0.8-0.9 of carapace length, slightly directed ventrally, distally acute, reaching or slightly overreaching level of distal margin of antennular peduncle; dorsal carina armed with five or six large, equidistant, acute teeth, interspaced by short setae, most proximal tooth at level of posterior orbital margin; ventral carina obsolete proximally, distinct distally, armed with single small acute subterminal tooth at level of interspace between terminal and preterminal dorsal teeth, distal margin convex; lateral carina conspicuous.

Fourth thoracic sternite without finger-like median process, anterior transverse ridge with shallow median notch. Posterior transverse ridge of fifth thoracic sternite with shallow median notch.

Abdominal somites (Fig. 1A) smooth, glabrous, third somite not posterodorsally produced; pleura of first to third somites truncate; pleura of fourth and fifth somites posteriorly produced, rounded; sixth somite short, 0.4-0.5 of carapace length, posteroventral margin produced, acute. Telson (Fig. 1D) 1.1-1.8 times as long as sixth abdominal somite, feebly tapering posteriorly, lateral margin sub-straight, posterior margin bluntly produced

centrally; dorsal surface armed with two pairs of small spines at 0.6 and 0.8 of telson length; posterior margin normally with three pairs of spines, lateral spines small, intermediate spines longest, robust, submedian spines slender, setulose (Fig. 1E); holotype with accessory spine present at posterolateral margin (Fig. 1D).

Eye (Fig. 1B) with large, globular cornea, with distinct ocellus; stalk short, anterior margin convex, maximum width subequal to, or slightly wider than maximum corneal diameter.

Antennular peduncle (Fig. 1F) reaching or falling slightly short of tip of rostrum; proximal segment longer than distal two segments combined; distolateral margin convex, rounded, anteriorly setose, lateral margin slightly convex, terminating in small acute tooth overreaching distolateral margin; ventromedial margin armed with small acute tooth; stylocerite short, slender, acute, falling slightly short of level of mid-length of proximal segment; statocyst normally developed; intermediate segment short, robust, obliquely articulated with distal segment, lateral margin slightly convex, sparsely setose, distomedial margin with long setae; distal segment slightly longer than intermediate segment, non-setose. Upper flagellum biramous, proximal seven segments fused, shorter free ramus with four segments; lower flagellum more slender than upper flagellum.

Antenna (Fig. 1G) with stout basicerite armed with subacute lateral tooth; carpocerite reaching level of proximal two fifths of length of scaphocerite; scaphocerite overreaching tip of rostrum by distal fourth, broad, 2.4-2.6 times as long as maximum width, lateral margin almost straight, terminating in acute tooth falling slightly short of distal margin of lamella, medial margin feebly convex.

Epistome unarmed.

Mandible (Fig. 2A) moderately robust, without palp; molar process obliquely truncated distally, with blunt teeth and small groups of setae; incisor process truncated distally, with three acute distal teeth. Maxillula (Fig. 2B) with feebly bilobed palp, larger lower lobe slightly curved, with small ventral tubercle; upper lacinia slightly expanded, distal margin truncated, armed with five or six simple spines and numerous submarginal short

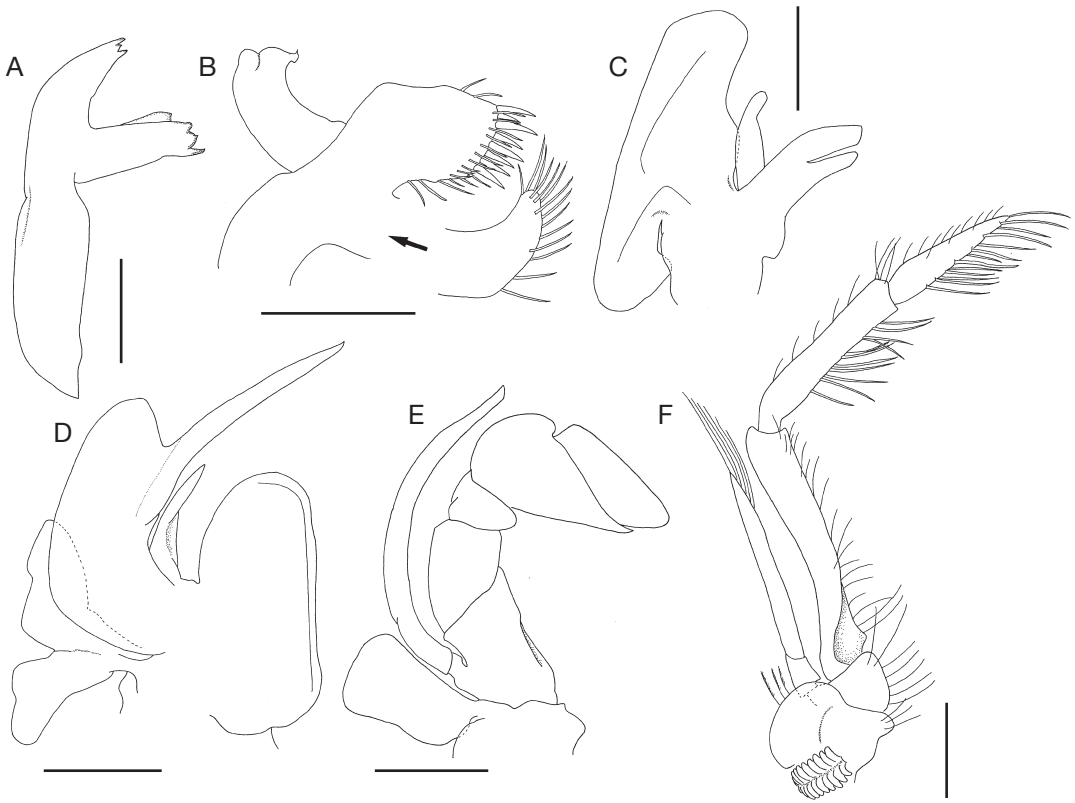


FIG. 2. — *Periclimenes dardanicola* n. sp., paratype ♀ (CMNH-ZC 01895): **A**, right mandible, ventral; **B**, right maxillula, ventral; **C**, right maxilla (marginal setae omitted), ventral; **D**, right first maxilliped (marginal setae omitted), ventral; **E**, right second maxilliped (marginal setae omitted), ventral; **F**, right third maxilliped, lateral. Scale bars: 0.5 mm.

setae; lower lacinia tapering, with numerous long setae. Maxilla (Fig. 2C) with simple palp slightly tapering distally; distal endite developed, deeply bilobed, upper lobe distally semi-quadrate, lower lobe slightly oblique distally, both lobes with distal setae; proximal endite obsolete; scaphognathite well developed, with marginal setae, anterior lobe broad, angular, posterior lobe short, slightly narrower than anterior lobe, medial margin convex. First maxilliped (Fig. 2D) with slender, elongate palp; distal endite with dense marginal setae and row of submarginal setae, proximal endite obsolete, with short marginal setae; exopod with well developed flagellum, caridean lobe well developed; epipod large, triangular, deeply bilobed. Second maxilliped (Fig. 2E) with normal endopod; dactylus moderately broad, medial margin straight;

propodus with anteromedial margin bluntly produced; carpus short, anteromedially angulate; ischium and basis completely fused, obliquely articulated with merus, medial surface slightly concave; exopod with well developed flagellum; coxa inflated medially; epipod semi-quadrate, without podobranch. Third maxilliped (Fig. 2F) with endopod slender, slightly compressed, reaching level of distal third of scaphocerite; ultimate segment tapering distally, ventral surface with about seven transverse rows of long setae; penultimate segment longer than ultimate segment, ventrally with long setae, dorsally with sparse short setae, long simple setae dorsodistally; antepenultimate segment twisted proximally, distinctly demarcated from basis, ventral margin with sparse setae; exopod with well developed flagellum, distally with

long setae; coxal plate oval; single well developed arthrobranch present.

First pereopod (Fig. 3A) moderately slender, overreaching distal margin of scaphocerite by chela. Chela (Fig. 3B) with palm subcylindrical, slightly compressed, 1.2-1.3 times as long as dactylus, with four transverse rows of serrulate grooming setae proximally; dactylus and fixed finger tapering, each terminating in small hooked unguis, cutting edges situated laterally, unarmed. Carpus 1.0-1.4 times as long as chela, slightly widening distally, medially with subapical, longitudinal row of serrulate grooming setae, ventral setae long. Merus 1.1-1.2 times as long as carpus, unarmed. Basis with ventral setose carina. Coxa with large linguiform process ventrally.

Second pereopods (Fig. 3C) well developed, robust, similar, overreaching distal margin of scaphocerite by lengths of carpus and chelae, ventral surfaces of palm, carpi, meri, and ischia usually with several short transverse rows of one to three spinules, bases of spinules forming squamous tubercles (Fig. 3D), dorsal surface of meri and ischia a few rows of spinules similar to ventral surface. Chela with palm subcylindrical, slightly compressed, 2.0-2.1 times as long as dactylus, entire dorsally, both fingers with numerous long setae; dactylus (Fig. 3E) terminating in small hooked unguis, distal three fourths of cutting edge unarmed, proximal fourth armed with single large semi-quadrate tooth; fixed finger (Fig. 3E) with distal cutting edge unarmed, proximal third armed with two large irregular teeth separated by diastema for dactylar tooth. Carpus short, robust, widening distally. Merus 2.0-2.6 times as long as carpus, distoventral lateral margin feebly angulate. Ischium slightly shorter than merus.

Third pereopod (Fig. 3F) moderately robust, falling slightly short of, or slightly overreaching distal margin of scaphocerite; merus 2.3-2.4 times as long as carpus, unarmed; carpus unarmed, with well marked distolateral lobe; propodus 2.5-2.7 times as long as carpus, with two long distoventral and two subterminal spines, and spaced set of five or six spines on ventral surface, dorsal surface sparsely with short setae; dactylus (Fig. 3G) about 0.2 of propodal length, slightly sinuous, biunguiculate, unguis clearly demarcated. Fourth pereopod

similar to third, falling slightly short of, or slightly overreaching distal margin of scaphocerite. Fifth pereopod overreaching distal margin of scaphocerite by length of dactylus, generally similar to anterior two pereopods, but with serrulate grooming setae distally.

Endopod of male first pleopod (Fig. 3H) oblong, feebly widened distally, medial margin with blunt protuberance. Endopod of male second pleopod (Fig. 3I) with long, plumose seta on proximal third of medial margin; appendices interna and masculina arising at proximal two fifths of mesial margin, appendix interna stout, subequal to appendix masculina in length, distally with few cincinnuli, appendix masculina slender, with distalmost and distomesial long setae with setules.

Uropod (Fig. 1D) with protopodite posteroventrally acute; exopod broad, slightly overreaching posterior margin of telson, posterior margin subquadrate, feebly rounded, lateral margin almost straight, terminating in acute tooth, with smaller mobile spine just mesial to distolateral tooth; endopod oblong, feebly oval, slightly tapering distally, subequal to exopod in length.

#### *Colour in life*

Dorsal surface of carapace, abdominal somites, telson, and uropods white, submarginally with longitudinal yellowish bands. Carapace and abdominal somites laterally deep red. Rostrum, antennular peduncle, and scaphocerite white. Ground colour of pereopods yellowish transparent, with red bands (Fig. 4).

#### *Hosts*

*Periclimenes dardanicola* n. sp. has only been found associated with hermit crabs of the genus *Dardanus*. Individuals of *P. dardanicola* n. sp. previously observed at the Japanese diving sites are usually associated with the sea anemone *Calliactis japonica*, attached on gastropod shells occupied by *Dardanus arrosor* (see Minemizu 2000). The host hermit crab associated with the holotype of *P. dardanicola* n. sp., however, was identified with *D. crassimanus*. In the case of the Vietnamese specimens, some 50-70 diogenids were examined and *P. dardanicola* n. sp. was only found in association with *Dardanus lagopodes* (Marin pers. comm.). Debelius (1999) shows the

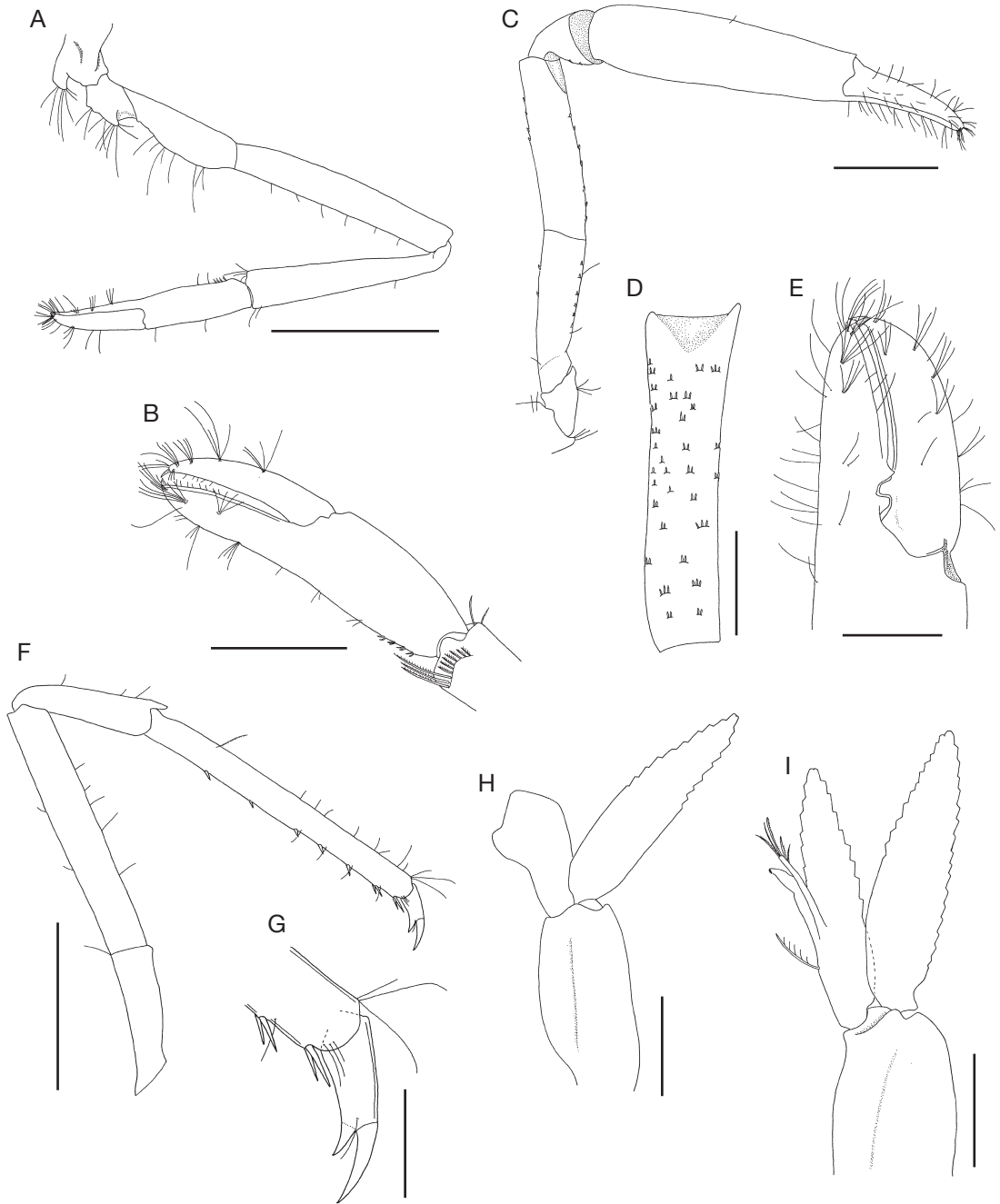


FIG. 3. — *Periclimenes dardanicola* n. sp.: **A-C, E-I**, holotype ♂ (CMNH-ZC 01894); **D**, paratype ♀ (CMNH-ZC 01895); **A**, right first pereiopod, lateral; **B**, same, chela and distal part of carpus, medial; **C**, right second pereiopod, lateral; **D**, same, merus, ventral; **E**, same, fingers and distal part of palm, medial; **F**, right third pereiopod, lateral; **G**, same, dactylus, lateral; **H**, right first pleopod of male (marginal setae omitted), dorsal; **I**, right second pleopod of male (marginal setae omitted), dorsal. Scale bars: A, C, D, F, 1.0 mm; B, E, H, I, 0.5 mm; G, 0.25 mm.

shrimp in association with *Dardanus pedunculatus* (Herbst, 1804).

#### REMARKS

Most of the specimens of *P. dardanicola* n. sp. show the presence of several short transverse rows of one to three spinules on the ventral surfaces of palm, carpi, meri, and ischia of the second pereiopod (Fig. 3D). Dorsal surfaces of meri and ischia also have the similar transverse rows, but the number of the rows is less than those on the dorsal surface. The bases of these spinules form the squamous tubercles. In one of the female paratypes (QM W 27972), however, the transverse rows of spinules are obsolete. We regard this morphological gap as intraspecific variation related to growth.

As previously mentioned, *P. dardanicola* n. sp. is closely similar to *P. parvus*. Morphologically, the two share the carapace without supraorbital and epigastric spines, the rostrum shorter than the carapace, with single ventral tooth, the short and widened carpus of the second pereiopod, and the biunguiculate dactyli of the ambulatory pereiopods. *Periclimenes dardanicola* n. sp. is distinguished from *P. parvus* by the following features: 1) inferior orbital angle more produced (Fig. 1C); 2) pterygostomial angle not markedly produced (Fig. 1C); 3) hepatic spine more posteriorly situated (Fig. 1C); 4) first pereiopod with dactylus shorter than palm, and carpus subequal or slightly longer than chela (Fig. 3A); and 5) fingers of second pereiopod with numerous long setae, distinctly shorter than the palm (Fig. 3C).

From the habitat and characteristic colour pattern, the individuals reported as *Periclimenes soror* by Takeda (1986), *P. imperator* by Debelius (1999), and *Pontoniinae* sp. by Minemizu (2000), are all identifiable without hesitation with the present new species.

Ivan Marin (pers. comm.) has informed us that two further specimens were separately collected from the Vietnamese locality, one from a dardanid living in a gastropod shell (*Cassis* sp.) without an anemone, and another with an anemone. He also remarks that: "All the shrimps were sitting near shell mouth, possibly connecting with crabs. During collecting they attached to the shell more

strongly and even hid deeper to the shell mouth. That [is] why I think they are not associated with anemone but with hermit-crab hosts". The specimens are presently held in the collections of the Laboratory of Evolutional Morphology of Marine Invertebrates, Moscow.

Decapod-decapod associations do not seem to be common. The alpheid shrimp, *Aretopsis amabilis* De Man, 1910, is only known as an associate of *Dardanus* hermit crabs (Bruce 1969; Kamezaki & Kamezaki 1986). Similar behaviour to that of *P. dardanicola* n. sp. has been documented by Bruce (1989) for *P. poupini* Bruce, 1989, which associates with a sea anemone carried by the hermit crab *Trizopagurus* sp. in deep waters of French Polynesia (see Bruce 1989).

#### *Periclimenes parvus* Borradaile, 1898

(Fig. 5)

*Periclimenes parvus* Borradaile, 1898: 384; 1899: 407, pl. 36, fig. 3a-c. — Bruce 1977: 3 (in part); 2003: 239 (in part). — Chace & Bruce 1993: 59 (list). — Li 2000: 221 (in part).

*Periclimenes (Cristiger) parvus* – Borradaile 1917: 363.

*Periclimenes (Periclimenes) parvus* – Kemp 1922: 149.

?*Periclimenes (Periclimenes) parvus* – Johnson 1962: 58 (see Remarks).

?*Periclimenes parvus* – Johnson 1976: 33 (list) (see Remarks).

MATERIAL EXAMINED. — New Britain. Rakaiya, Blanche Bay, 1.III.1898, coll. A. Willey, 2 syntypes 1.9 mm CL (UMZC unnumbered).

DISTRIBUTION. — Known only from the type locality, viz., Rakaiya, Blanche Bay, New Britain, Papua New Guinea (Borradaile 1898).

#### REMARKS

The syntypes of *P. parvus* have the following morphological features: the rostrum is not particularly deep, with a feebly developed ventral carina, arched, with six or seven acute dorsal teeth, all anterior to the postorbital margin; the inferior orbital angle is produced but blunt (Fig. 5A). The carapace appears deeper anteriorly than posteriorly, with the



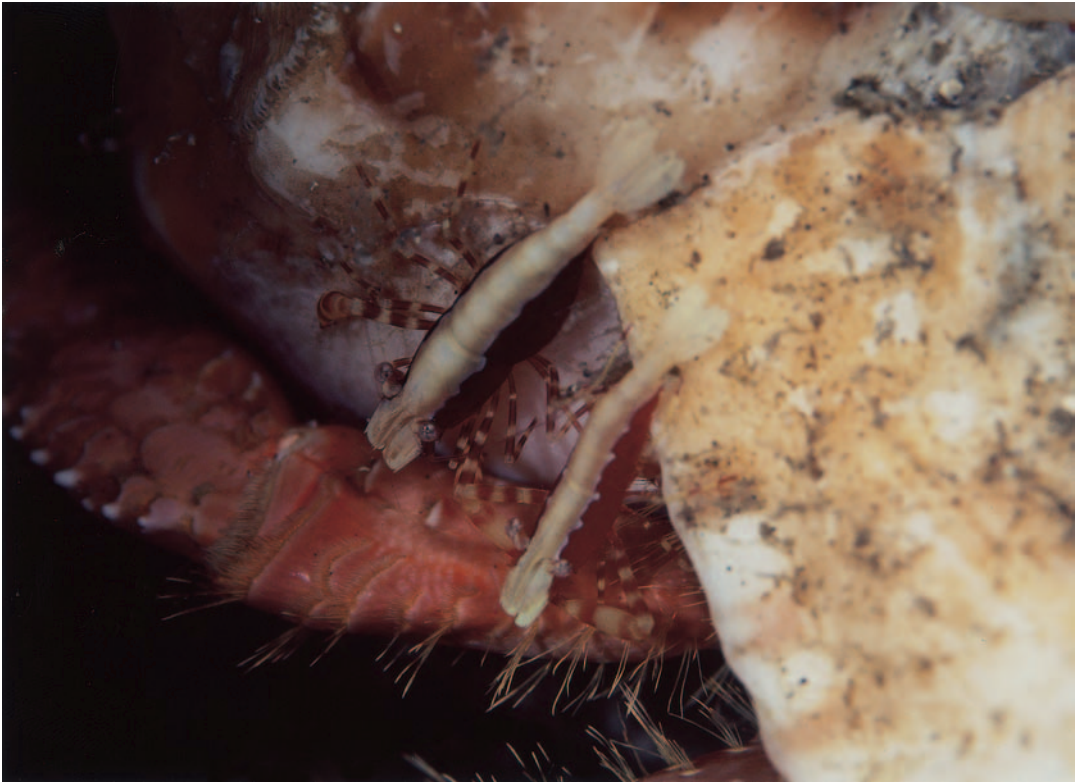


FIG. 4. — *Periclimenes dardanicola* n. sp., living individuals *in situ*, in association with *Dardanus arrosor* (Herbst, 1796) at Ose-zaki, Suruga Bay, Honshu, Japan, 10–15 m, January 2000. Photo T. Yanagisawa.

pterygostomial angle produced and the hepatic spine at level of posterior margin of orbit (Fig. 5A). The fourth thoracic sternite is without a median process but bears a low transverse ridge without a median notch posteriorly. The first pereiopod has the fingers of the chela feebly subspatulate, with lateral cutting edges, subequal to the palm length, the carpus distinctly shorter than the chela, about 1.5 times as long as palm, 3.5 times as long as the distal width (Fig. 5B); the coxa bears a large medial process. The chela of the second pereiopod is slightly shorter than the carapace length, with the palm about 2.6 times longer than deep, with the fingers about 0.75 of the palm length (Fig. 5D); the fingers are also sparsely setose, without the numerous long setae (Fig. 5D); the palm, merus and ischium are smooth, and without the remarkable numerous small squamous tubercles and transverse

rows with short setae (Fig. 5C). The ambulatory dactylus is about 0.28 of the length of propodus (Fig. 5E).

One specimen is largely disarticulated, with the carapace still attached to the abdomen, but the thoracic sternites are detached, and all the appendages separated. The abdomen is also broken between the fourth and fifth somites. The second specimen is more intact but is considerably distorted, with the left first, third and fourth pereiopods still attached. Two first pereiopods, two major second pereiopods and four detached ambulatory pereiopods are also preserved.

Johnson (1962, 1976) reported the occurrence of *P. parvus* in Singapore waters on the basis of a single specimen in the Bedford-Lanchester collection, Natural History Museum, but it is no longer extant. No further specimens have since

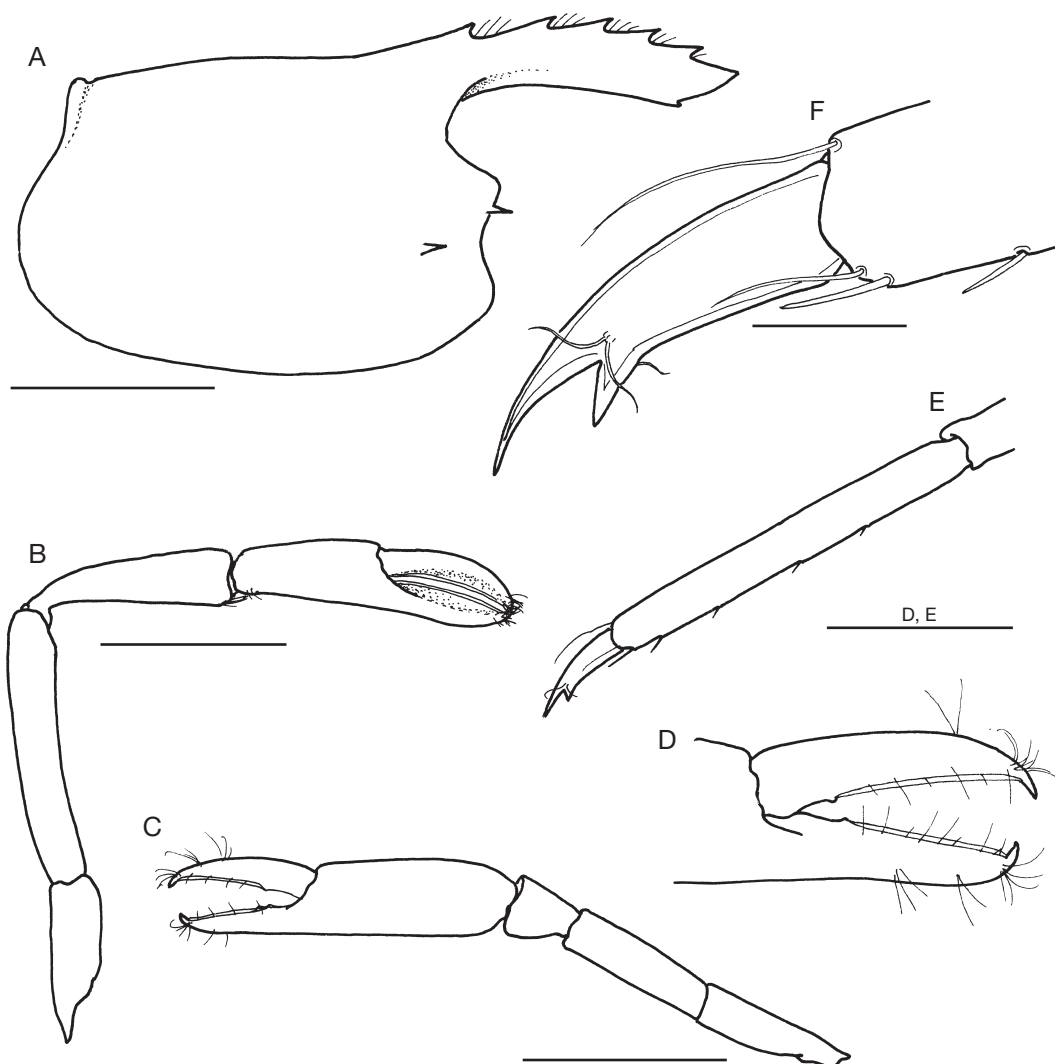


FIG. 5. — *Periclimenes parvus* Borradaile, 1898, ??♀ syntype, New Britain, Papua New Guinea: **A**, carapace and rostrum, lateral; **B**, right first pereiopod, lateral; **C**, left second pereiopod, lateral; **D**, same, fingers, medial; **E**, left ambulatory pereiopod, propodus and dactylus, lateral; **F**, same, distal propodus and dactylus, lateral. Scale bars: A, C, F, 1.0 mm; B, D, E, 0.5 mm.

been collected in Singapore waters (Yang Chang Man pers. comm.), and Johnson's identification must be considered doubtful.

#### Dedication

Caridean shrimps are rarely associated with hermit crabs, thus, we think that our paper is suitable to

be included in a publication in honor of Dr Patsy A. McLaughlin, who is the doyen of hermit crab taxonomy, and who has contributed greatly to the knowledge of their diversity.

#### Acknowledgements

We wish to express our sincere gratitude to skillful Japanese divers, R. Minemizu, H. Watanabe, and

T. Yanagisawa for donating to us the specimens collected from Suruga Bay. Our thanks also go to T. Yanagisawa for providing us with the underwater photograph taken by him. We are also most grateful to Ivan Marin, Moscow State University, for making available to us his Vietnamese material and his observations on *P. dardanicola* n. sp., and Dr Richard Preece, University Museum of Zoology, University of Cambridge, for the loan of Borradaile's type material of *P. parvus*. This study was facilitated by support from the Australian Biological Resources Study (AJB).

## REFERENCES

- BORRADAILE L. A. 1898. — A revision of the Pontoniinae. *The Annals and Magazine of Natural History, Including Zoology, Botany, and Geology* series 7, 2: 376-391.
- BORRADAILE L. A. 1899. — On the Stomatopoda and Macrura brought by Dr. Willey from south seas, in WILLEY A. (ed.), *Zoological Results Based on Material from New Britain, New Guinea, Loyalty Islands and Elsewhere, Collected During the Years 1895, 1896 and 1897*. University Press, Cambridge: 395-428, pls 36-39.
- BORRADAILE L. A. 1917. — On the Pontoniinae. The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr J. Stanley Gardiner, vol. VI. *The Transactions of the Linnean Society of London* 2nd series, Zoology 17: 323-396.
- BRUCE A. J. 1967. — Notes on some Indo-Pacific Pontoniinae, III-IX: descriptions of some new genera and species from the Western Indian Ocean and the South China Sea. *Zoologische Verhandelingen* 87: 1-73.
- BRUCE A. J. 1969. — *Aretopsis amabilis* De Man, an alpheid shrimp commensal of pagurid crabs in the Seychelle Islands. *Journal of the Marine Biological Association of India* 11 (1/2): 175-181.
- BRUCE A. J. 1977. — The hosts of the coral-associated Indo-West Pacific pontoniine shrimps. *Atoll Research Bulletin* 205: 1-19.
- BRUCE A. J. 1989. — *Periclimenes poupini* sp. nov., a new anemone-associated shrimp from deep-water traps (Crustacea, Decapoda, Palaemonidae). *Bulletin du Muséum national d'Histoire naturelle* 4<sup>e</sup> sér., sect. A, 11 (4): 851-863.
- BRUCE A. J. 2003. — The pontoniine shrimp fauna of Hong Kong and the South China Sea (Crustacea: Decapoda: Palaemonidae), in MORTON B. (ed.), *Perspectives on Marine Environment Change in Hong Kong and Southern China, 1977-2001. Proceedings of an International Workshop Reunion Conference, Hong Kong 21-26 October 2001*. Hong Kong University Press, Hong Kong: 209-257.
- CHACE F. A. JR. & BRUCE A. J. 1993. — The caridean shrimps (Crustacea: Decapoda) of the Albatross Philippine Expedition 1907-1910. Part 6: superfamily Palaemonoidea. *Smithsonian Contributions to Zoology* 543: i-vii + 1-152.
- DEBELIUS H. 1999. — *Crustacean Guide of the World*. IKAN-Unterwasserarchiv, Frankfurt, 321 p.
- HOLTHUIS L. B. 1952. — The Decapoda of the Siboga Expedition, part XI. The Palaemonidae collected by the Siboga and Snellius expeditions with remarks on other species, part II: subfamily Pontoniinae. *Siboga-Expedition Monograph* 39a10: 1-254.
- JOHNSON D. S. 1962. — A synopsis of the Decapoda Caridea and Stenopodidea of Singapore, with notes on their distribution and a key to the genera of Caridea occurring in Malayan waters. *Bulletin of the National Museum, State of Singapore* 32: 44-79, pl. 2.
- JOHNSON D. S. 1976. — Prawns of the Malacca Straits and Singapore waters. *Journal of the Marine Biological Association of India* 18 (1): 1-54.
- KAMEZAKI N. & KAMEZAKI Y. 1986. — [On the ecology of alpheid shrimp *Aretopsis amabilis* De Man]. *Nankiseibutsu* 28 (1): 11-15 (in Japanese).
- KEMP S. 1922. — Notes on Crustacea Decapoda in the Indian Museum. XV. Pontoniinae. *Records of the Indian Museum* 24 (2): 113-288, pls 3-9.
- LI X. 2000. — *Catalog of the Genera and Species of Pontoniinae Kingsley, 1878 (Decapoda, Palaemonidae)*. Xueyuan Press, Beijing, 317 p.
- MINEMIZU R. 2000. — [*Marine Decapod and Stomatopod Crustaceans mainly from Japan*]. Bunnichi-Sogo Shuppan, Tokyo, 344 p. (in Japanese).
- NOBILI G. 1904. — Diagnoses préliminaires de vingt-huit espèces nouvelles de stomatopodes et décapodes macroures de la mer Rouge. *Bulletin du Muséum d'Histoire naturelle* 10 (5): 228-238.
- TAKEDA M. 1986. — [Arthropoda], in MASUDA H., HAYASHI M., NAKAMURA K. & KOBAYASHI Y. (eds), [*Marine Invertebrates*]. Tokai University Press, Tokyo: 99-146 (in Japanese).

Submitted on 16 September 2005;  
accepted on 27 December 2005.