

# Description of two new species from the genera *Palaemonella* Dana, 1852 and *Vir* Holthuis, 1952 (Crustacea: Caridea: Palaemonidae: Pontoniinae)

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Marin, I.N. Description of two new species from the genera *Palaemonella* Dana, 1852 and *Vir* Holthuis, 1952 (Crustacea: Caridea: Palaemonidae: Pontoniinae).

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Key words: Crustacea; Caridea; Pontoniinae; *Palaemonella*; *Vir*; Vietnam; new species; new genus.

Two new species, *Palaemonella aliska* spec. nov. and *Vir longidactylus* spec. nov. are described from Nhatrang Bay, Vietnam. *Palaemonella aliska* spec. nov., collected from the holes burrowed by *Alpheus* cf. *bellulus* Miya & Miyake, 1969 and an unidentified goby, clearly differing from the remained species of the genus by its highly developed dorsal rostral carina, reaching to the mid-length of the carapace, and the presence of three well developed dorsal teeth situated on the carapace posterior to the orbital margin. *Vir longidactylus* spec. nov., collected on colonies of the caryophyllid coral *Physogyra lichtensteini* Edwards & Haime, 1851, differs from all species of the genus by its highly produced sharp molar process of the mandible and the unusually long and straight fingers of the second pereopod.

## Introduction

The pontoniine shrimp genera *Palaemonella* Dana, 1852 and *Vir* Holthuis, 1952 are the only genera in the subfamily with a mandibular palp, which clearly differentiates them from the other genera. Presently several new species from these genera have been described (Okuno, 1999; Bruce, 2002a; 2002b; Bruce, 2003; Marin & Anker, 2005; Marin, 2007) increasing their numbers to eleven and four species, respectively.

Most of the species of the genus *Palaemonella* are free-living while three species are known as symbionts. *Palaemonella rotumana* (Borradaile, 1898) is known as a facultative symbiont of scleractinian corals and dead coral boulders (Kemp, 1922; Bruce, 1970, 1975; pers. observ.), *P. pottsii* Borradaile, 1915 is an obligate symbiont of feather stars (Echinodermata: Crinoidea) (Bruce, 2002a; pers. observ.) and *P. lata* Kemp, 1922 mentioned as symbiont of littoral sponges (Chace & Bruce, 1993; Bruce, 2002a). Most of the known species of genus *Vir* are symbionts of caryophyllid corals (Scleractinia: Caryophyllidae) from the genera *Plerogyra* Milne Edwards & Haime, 1848 and *Euphyllia* Dana, 1846 (Bruce, 2003; Marin, 2007), with only one species, *V. orientalis* (Dana, 1852) known as free-living (Chace & Bruce, 1993). Previously (Marin, 2007) it was suggested that new hosts and habitats, probably, will show new species from these genera.

During collecting in Nhatrang Bay, Vietnam, two undescribed species from these genera were collected. Postorbital carapace length (pocl, in mm) is used as a standard length. Material is deposited in collections of the National Natuurhistorisch Museum, Leiden (RMNH) and the author's collection in the Laboratory of Ecology and Morphology of Marine Invertebrates, IPEE, Moscow (LEMMI).

## Systematics

*Palaemonella aliska* spec. nov.  
(figs 1-5, 8a)

Material.— Holotype, ovigerous ♀, pochl. 5.1 mm, Allotype ♂, pochl. 4.2 mm (RMNH D 51918), South China Sea, Vietnam, Nhatrang Bay, Tre Island, Tre Bay, mangrove littoral, yabbi-pump, inside the holes occupied by *Alpheus* cf. *bellulus* and unidentified gobiid fish, 12.vii.2006, I.N. Marin; paratype ♀, pochl. 4.3 mm, dissected (LEMMI), same locality as holotype, yabbi-pump, 7.vii.2006, I.N. Marin.

Description.— Carapace swollen, smooth, with well developed antennal and hepatic teeth; hepatic tooth smaller than antennal; without supraorbital of supraocular teeth (fig. 2a-c). Rostrum horizontal, tapering and slightly compressed, slightly overreaching antennal scale; dorsal rostral carina well developed, reaching to middle of carapace, bearing eight conspicuous teeth; three teeth situated on carapace behind level of orbital margin with two teeth posterior to level of hepatic spine, posteriormost tooth not isolated from rest of dorsal rostral series; ventral rostral carina well developed, with two or three ventral teeth; lateral lamina feebly developed. Orbit feebly developed, inferior orbital angle projecting, rounded.

Abdominal somites smooth; pleura of first to fifth abdominal somites rounded, postero-lateral angle of sixth abdominal somite rounded (fig.1). Telson about twice as long as maximal proximal width (fig. 5f), tapering anteriorly, with distinctly acute distal margin; two pairs of large dorsal spines, about 0.15 of telson length, situated at 0.75 and 0.4 of telson length; three pairs of posterior spines contain slender lateral, long and slender intermediate and slender submediate spines being half length of intermediate spines.

Eyes large and well developed, with rounded cornea (fig. 2d).

Antennula (fig. 2e) well developed; basal segment slightly less than two times as long as wide; lateral border well defined from stalk of segment, bearing large acute distolateral tooth; distal medial lobe slightly concave, rounded, with long setae; distinct robust ventral tooth submarginal, situated in middle of medial line of stalk of basal segment; stylocerite well developed, acute, overreaching middle of basal segment; intermediate segment robust, as long as wide, with produced inner distal edge bearing long setae; distal segment about two times as long as wide. Upper flagellum long and slender, shorter ramus with more than ten segments with ten groups of aesthetascs, longer free ramus with more than fifteen segments. Lower flagellum filiform with more than thirty segments.

Antenna (fig. 2f) well developed, basicerite bearing long sharp distolateral tooth; carpocerite robust, as long as wide; flagellum well developed; scaphocerite slender and far exceeding antennular stalk, about three times as long as maximum width, with developed distolateral tooth.

Mouthparts characteristic for the genus. Mandible (fig. 3a) robust, with two-segmented small palp; incisor process stout and robust, tapering distally, with large terminal marginal teeth and one small tooth situated in between; molar process well developed, robust (fig. 3b). Maxillula (fig. 3e) normal; palp well developed, bilobed; upper lacinia slightly curved, flaring distally, with strong distal spines; lower lacinia slender, distally rounded, with distal setae. Maxilla (fig. 3d) with well developed simple palp; endites well developed, distal lobes subequal, furnished with stiff, elongated setae;

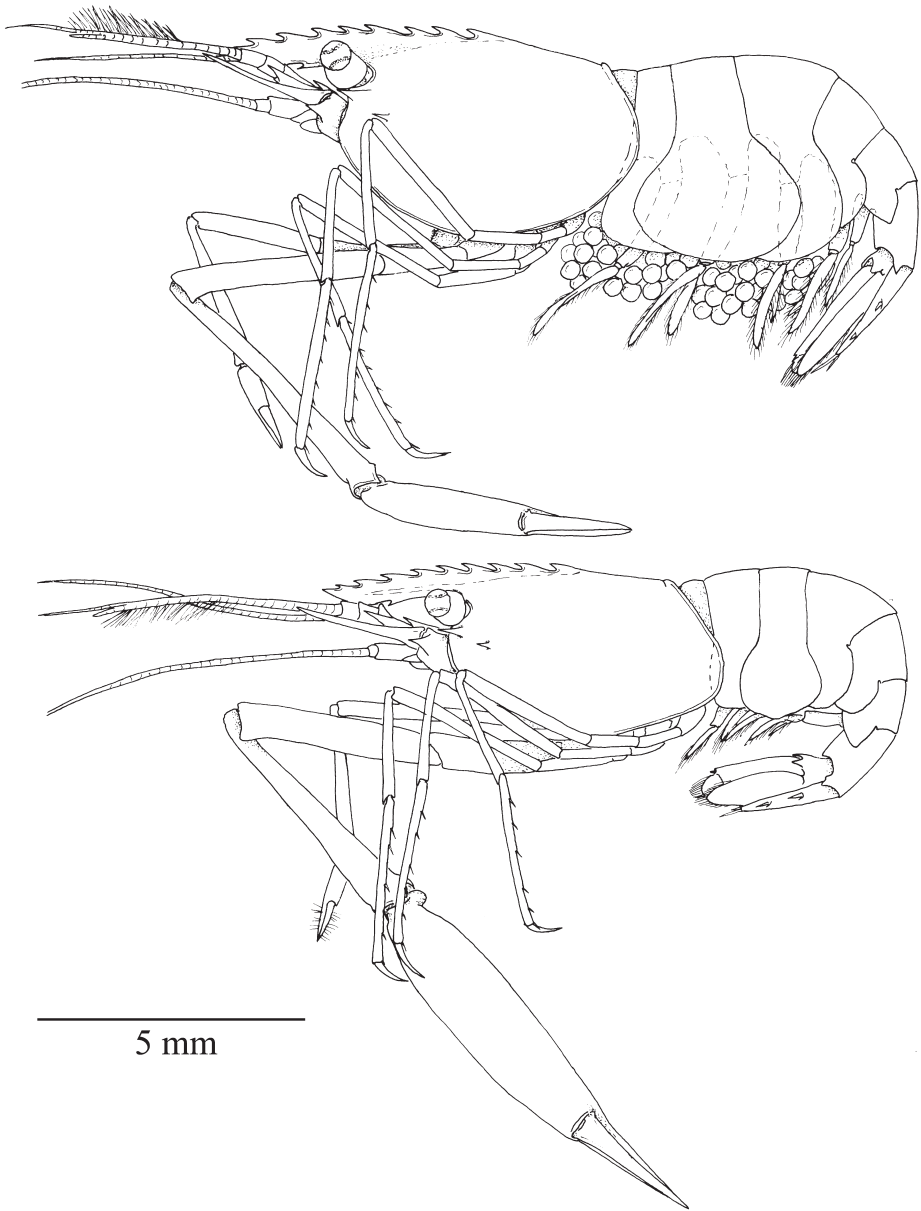


Fig. 1. *Palaemonella aliska* spec. nov.: holotype female, pochl. 5.1 mm (upper) and allotype male, pochl. 4.2 mm (lower).

scaphognathite with plumose setae. First maxilliped (fig. 3e) with feebly separated, well developed endites; palp without distal setae; exopod well developed, with large caridean lobe bearing plumose setae; epipod triangular in shape, well developed. Second maxilliped (fig. 3f) with exopod well developed; distolateral margin of propodus

broadly rounded, with slender setae; dactylus about four times longer than broad, with numerous spines along distal margin; epipod subrectangular; with podobranch, consisting of stout peduncle bearing two well developed lamella distally (fig. 3g). Third maxilliped (fig. 3h) with normal segments; exopod well developed, exceeding length of ischiomerus; ischiomerus about four times as long as maximum width, penultimate segment slender, about four times as long as wide; terminal segment also slender, about four times as long as wide; epipod subrectangular; arthrobranch present, well developed.

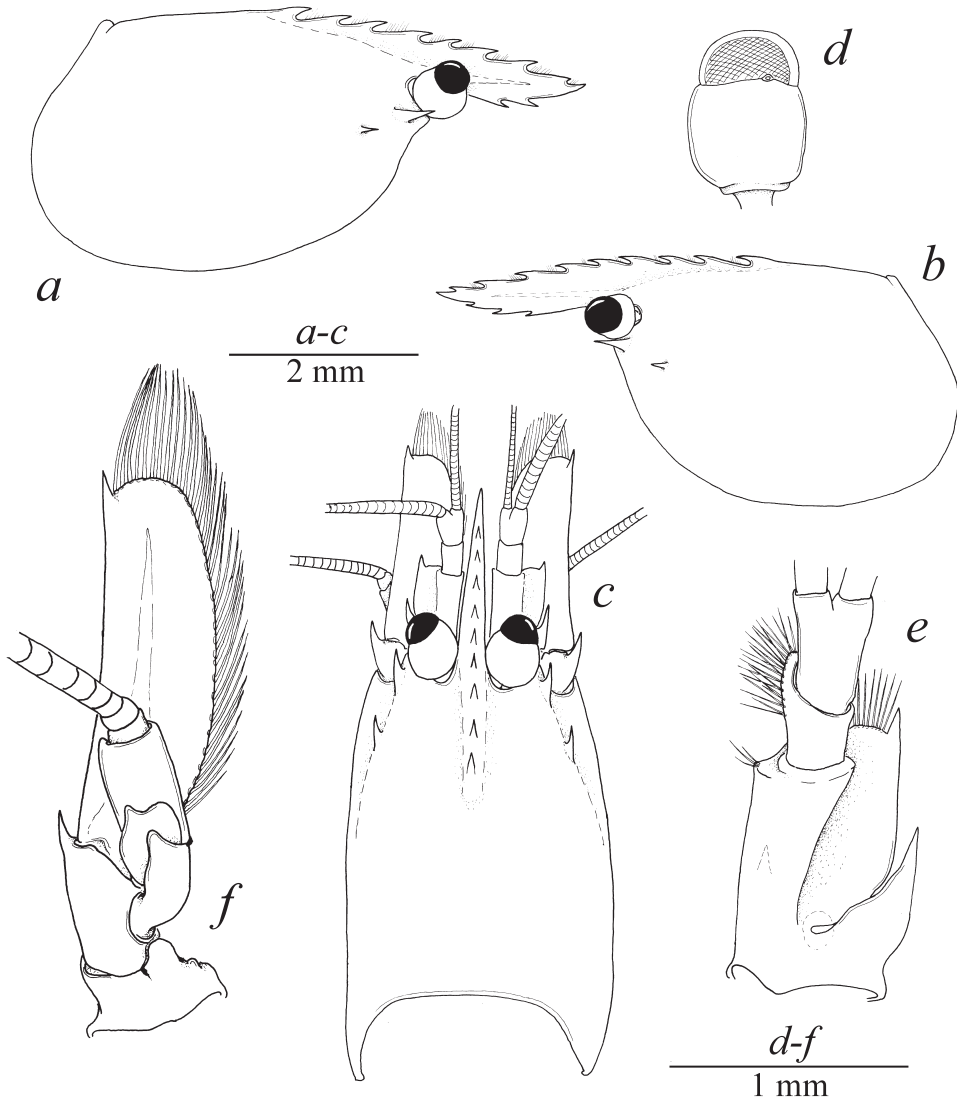


Fig. 2. *Palaemonella aliska* spec. nov.: *a*, *c*, holotype female, pocl. 5.1 mm, *b*, allotype male, pocl. 4.2 mm, *d-f*, paratype female, pocl. 4.3 mm. *a*, *c*, carapace and rostrum, lateral view; *c*, carapace and rostrum, dorsal view; *d*, eye; *e*, antenna; *f*, antenna.

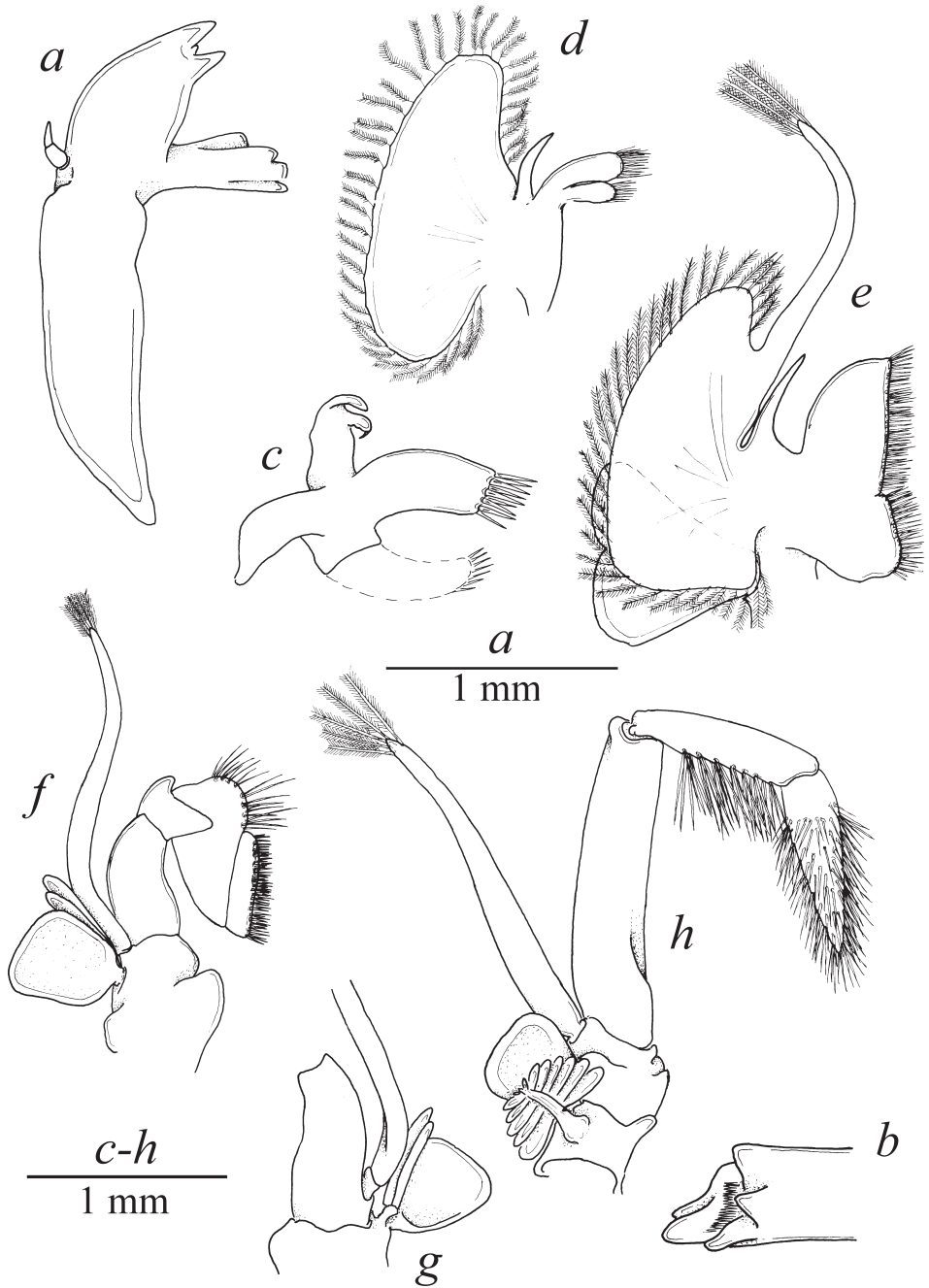


Fig. 3. *Palaemonella aliska* spec. nov.: paratype female, pochl. 4.3 mm. *a*, mandible; *b*, distal part of molar process of mandible; *c*, maxillula; *d*, maxilla; *e*, first maxilliped; *f*, second maxilliped; *g*, epipod and podobranch of second maxilliped; *h*, third maxilliped.

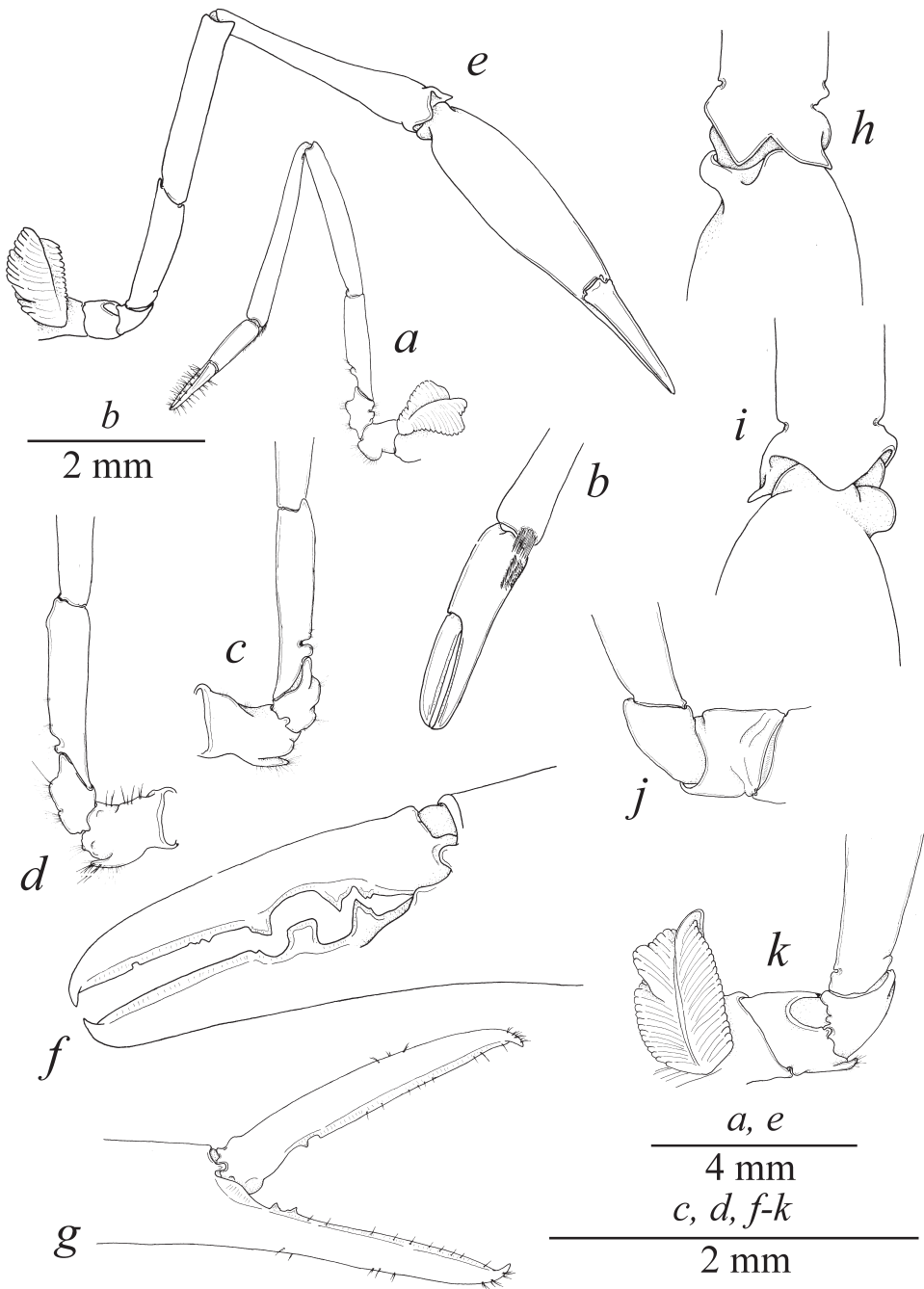


Fig. 4. *Palaemonella aliska* spec. nov.: a-d, g, j, k, paratype female, pochl. 4.3 mm, e, f, h, i, allotype male, pochl. 4.2 mm; a, first pereiopod; b, palm of first pereiopod; c, d, proximal segments of first pereiopod, e, second pereiopod; f, g, fingers of second pereiopods; h, i, distal margin of carpus of second pereiopod; j, k, proximal segments of second pereiopod.

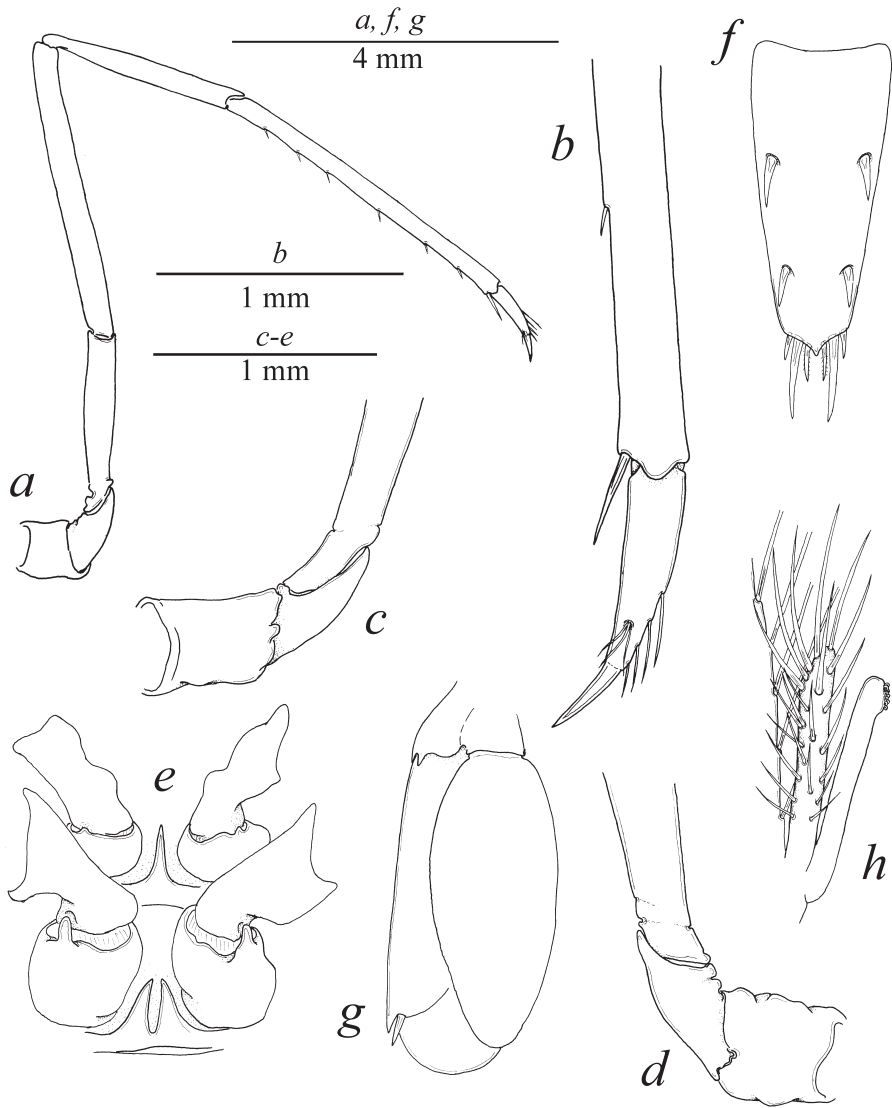


Fig. 5. *Palaemonella aliska* spec. nov.: a-g, paratype female, pochl. 4.3 mm, h, allotype male, pochl. 4.2 mm. a, third pereiopod; b, distal part of propodus and dactylus of third pereiopod; c, d, proximal segments of third pereiopod; e, thoracic sternites I-II, ventral aspect; f, telson; g, uropods; h, appendix masculina.

First pereiopod (fig. 4a) slender; basis about 1.5 times as long as wide; ischium about four times as long as wide (fig. 4 c, d); carpus slender, seven times as long as wide; propodus about ten times as long as wide in distal part, slightly tapering proximally; palm twice as long as wide, subcylindrical; fingers slender, about five times as long as wide, with acute tips and feebly developed straight cutting edges.

Second pereopods similar in size and shape; with slender segments (fig. 4e); basis equal in length and width (fig. 4k); ischium about four times as long as maximal width; merus about 5.5 times longer than maximal width, with produced distal margin; carpus about five times as long as wide, flared distally, with two rounded distal lobes and one produced disto-lateral lobe (figs 4h, i); palm subcylindrical, about three times as long as maximal width, more robust in males; fingers slender, about 7.5-8.5 times as long as wide, straight, with acute, curved tips; dactylus of females with well developed straight cutting edge reaching from tip to second third of dactylus length, with small tooth in proximal part (fig. 4g); fixed finger with well developed cutting edge bearing two small distinct teeth in its proximal part.

Third pereopod (fig. 5a) slender, with unarmed segments; basis about 1.5 times as long as wide (fig. 5c, d); ischium about seven times as long as wide; merus about twelve times as long as wide; carpus about eight times as long as maximum wide, with projected disto-dorsal margin; propodus about seventeen times as long as wide, with ventral margin bearing six ventral and pair of disto-ventral teeth; dactylus (fig. 5b) moderately robust, about four times as long as maximum width, significantly tapering distally, with pointed slender curved unguis and four preterminal dorsal straight setae. Fourth and fifth pereopods similar.

Pleopods normal, endopod of second pleopods in male with developed appendix masculina bearing numerous long simple setae (fig. 5h). Uropods (fig. 5g) exceeding telson; lateral border of uropodal endopod with small distal tooth and mobile spine.

Remarks. — The allotype male is generally similar to the described holotype female but differing in its smaller size, rostral formula 3+6/3 and more developed second pereopod. The second pereopod has a more robust palm (fig. 4 e); the dactylus of the male possesses a well developed straight cutting edge reaching to the middle of the dactylar length, with two well developed teeth separated by a distinct notch (fig. 4f); the fixed finger has a well developed straight cutting edge reaching to the middle of the dactylar length and separated from the proximal teeth by a notch, with two large teeth situated in the proximal half of the finger with a distinct notch in between.

Colouration. — The body and appendages are generally translucent with numerous tiny red chromatophres. Abdomen, carapace, proximal part of telson and uropods bear yellow and white spots. Articulations of segments of the third maxilliped and pereopods are covered with white bands (fig. 9a).

Etymology. — The species is named in honor of my wife Alissa Kosyan helping me during the preparation of the majority of my publications.

Hosts. — The type specimens were collected from the holes occupied by snapping shrimps *Alpheus* cf. *bellulus* Miya & Miyake, 1969 (Caridae: Alpheidae) and an unidentified gobiid fish (Teleostei: Gobiidae). Possibly this species also associated with other burrowing animals like fishes *Opistognathus* spec. (see photo in Debelius, 2001: 192).

Distribution. — Known from type locality, Nhatrang Bay, Vietnam and, probably, Similan Island, Thailand.

Differential diagnosis. — The species is most similar to *Palaemonella lata*, but clearly differs from the latter and other species of the genus by the presence of a highly developed dorsal rostral carina, reaching to the middle of the carapace and bearing three dorsal teeth on the carapace posterior to the orbital margin, with the two posterior teeth situated posterior to the level of the hepatic spine. Known specimens of *P. lata* possess only two dorsal rostral teeth situated posterior to the orbital margin. Additionally, the



dorsal rostral carina of the present species is not as well developed and not reaching to the middle of the carapace (Kemp, 1922; Bruce, 1970; 2002a). Some clear differences in coloration are present between *P. lata* and the present species.

*Vir longidactylus* spec. nov.  
(figs 6-8, 9c)

Material. — Holotype, ovigerous ♀, pocl. 3.2 mm, Allotype ♂, pocl. 2.1 mm (RMNH D 51919). South China Sea, Vietnam, Nhatrang Bay, Tre Island, Tre Bay, rocks, on caryophyllid coral *Physogyra lichtensteini*, at the depth of 5 meters, 3.vii.2006, I.N. Marin.

Description. — Holotype female. Carapace swollen, smooth, with antennal spine. Rostrum straight, tapering and slightly compressed, with developed dorsal carina bearing nine conspicuous teeth, posteriormost dorsal tooth situated posterior to orbital margin; one ventral teeth (Fig. 7a, b); lateral carina feebly developed. Orbit feebly developed, inferior orbital angle rounded, slightly projecting.

Abdominal somites smooth; pleura of first to fifth abdominal somites rounded, postero-lateral angle of sixth abdominal somite rounded (fig. 6). Telson about 2.5 times as long as wide in proximal part (fig. 7j), tapering anteriorly, with two pairs of small dorsal submarginal spines situated at 0.85 and 0.75 of telson length; three pairs of posterior spines contain short lateral, long and slender intermediate and slender submediate spines, similar in length to intermediate spines.

Eyes large and well developed, with rounded cornea (fig. 7c).

Antennula (fig. 7d) well developed; basal segment about two times longer than wide, with lateral border bearing small subacute distolateral tooth, distal medial lobe slightly concave, rounded, with small setae; distinct robust ventral tooth submarginal, situated slightly proximal to middle of medial border of basal segment; stylocerite well developed; intermediate segment slender, about 1.5 times as long as wide; distal segment about two times as long as wide. Upper flagellum long and slender, shorter ramus consists of ten segments with eight-nine groups of aesthetascs, longer free ramus consists of more than ten segments; lower flagellum filiform with more than thirty segments.

Antenna (fig. 7f) well developed, basicerite with rounded distal margin; carpocerite slender, about three times as long as wide; flagellum well developed; scaphocerite slender and exceeding antennular stalk, about 2.4 times as long as maximum width, with poorly developed distolateral tooth.

Mouthparts characteristic for genus. Mandible (fig. 7g) robust, with two-segmented palp; incisor process tapering distally, with three terminal teeth; molar process well developed, robust, with produced sharp disto-outer edge (fig. 7h). Maxillula (fig. 7i) normal; palp well developed, bilobed; upper lacinia slightly curved, flaring distally, with strong distal spines; lower lacinia slender, distally rounded. Maxilla with well developed simple palp; endites well developed, basal endite feebly bilobed, distal lobes subequal, furnished with stiff, elongated setae; scaphognathite with plumose setae. First maxilliped with distinct and well developed endites; palp with one distal setae; exopod well developed with large caridean lobe bearing plumose setae; epipod triangular in shape, well developed. Second maxilliped with exopod well developed; distolateral margin of propodus broadly rounded, with slender setae; dactylus about three times longer than broad, with numerous spines along distal margin; epipod subrectangular;

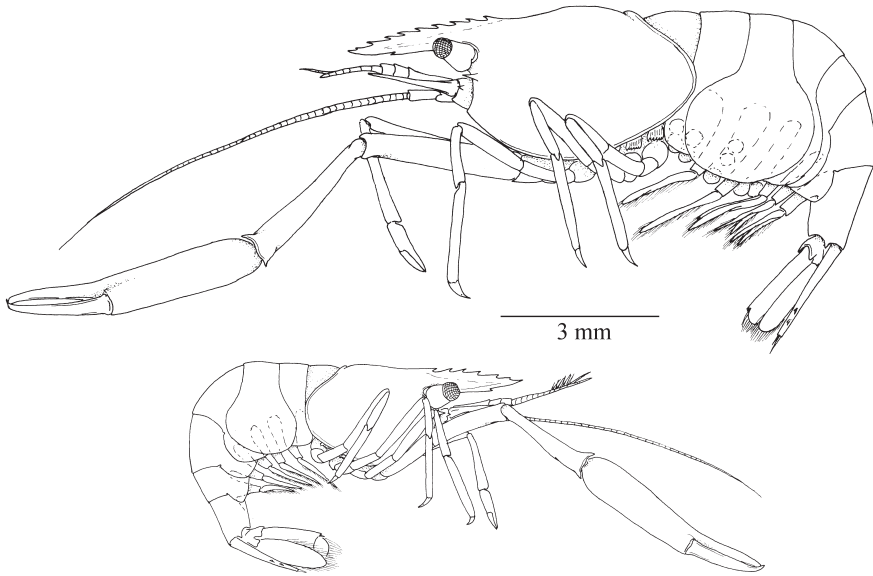


Fig. 6. *Vir longidactylus* spec. nov.: holotype female, pochl. 3.2 mm (upper) and allotype male, pochl. 2.1 mm (lower).

podobranch absent. Third maxilliped with normal segments; exopod well developed, exceeding length of ischiomerus; ischiomerus about three times as long as maximum width, tapering significantly distally, penultimate segment slender, about five times as long as wide; terminal segment also slender, about five times as long as wide; epipod ear-shaped; arthrobranch absent.

First pereiopod (fig. 8a) slender, basis about 1.5 times as long as wide; ischium about 3 times as long as wide (fig. 8b, c); merus slender, about eight times as long as wide; carpus about ten times as long as distal width, slightly tapering proximally; palm twice as long as wide, cylindrical; fingers slender, about four times as long as wide, with acute tips and feebly developed cutting edges.

Second pereiopod similar in size and shape; with slender segments (fig. 8d); basis equal in length and width (fig. 8g); ischium about four times as long as maximal width; merus about 5.5 times longer than wide, without disto-ventral tooth; carpus about four times longer than maximal width, flared distally, with two distinct rounded distal lobes (fig. 8f); palm subcylindrical, about three times as long as maximal width; fingers slender, about 8.5 times as long as wide, straight, with acute, curved tips; dactylus with well developed cutting edge bearing two small teeth in proximal part; fixed finger with well developed cutting edge bearing two small distinct teeth and series of small teeth in proximal part (fig. 8e).

Third pereiopod (fig. 8h) slender, with unarmed segments; basis about twice as long as wide; ischium about 3.5 times as long as wide; merus about six times as long as wide; carpus about 3.5 times as long as maximum wide, tapering proximally, with projected disto-dorsal margin; propodus about ten times as long as wide, with smooth

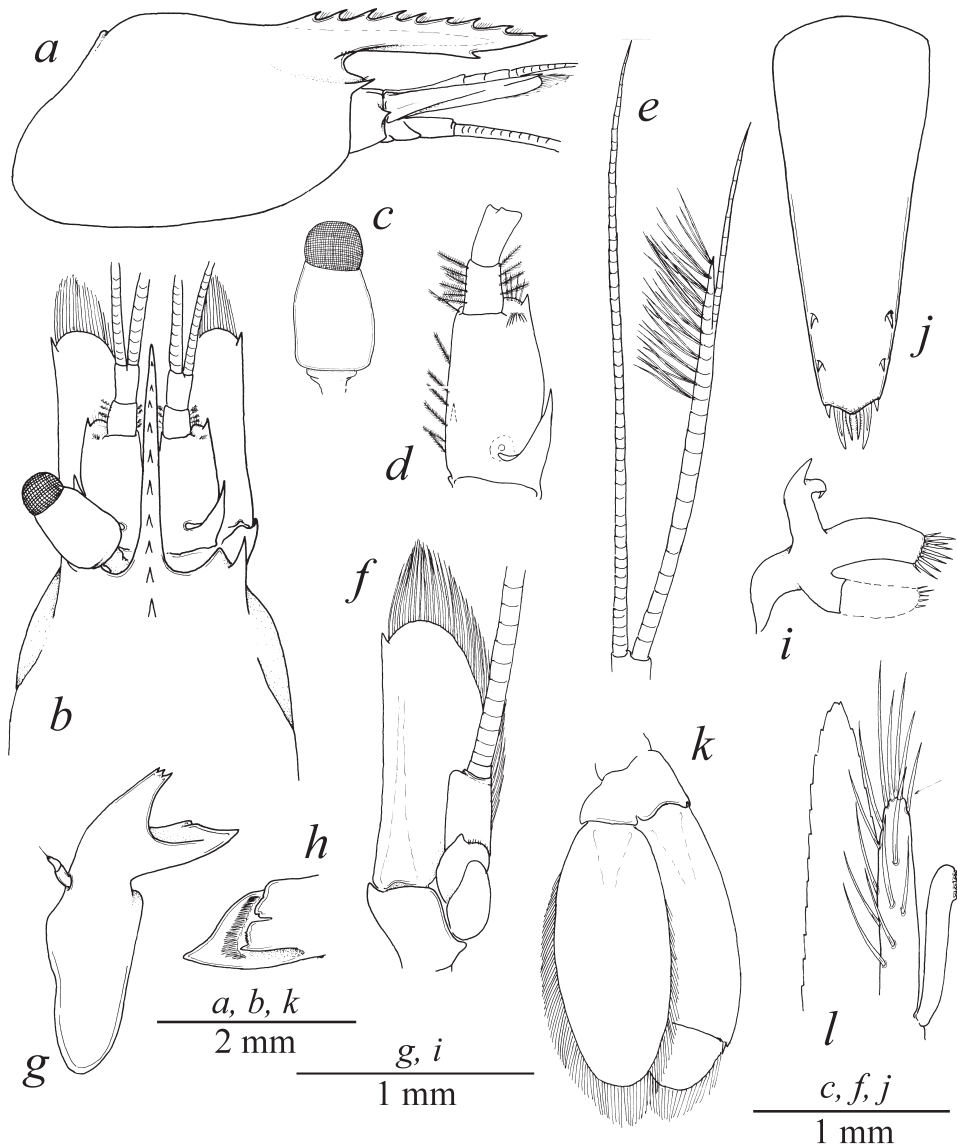


Fig. 7. *Vir longidactylus* spec. nov.: a-k, holotype female, pochl. 3.2 mm, l, allotype male, pochl. 2.1 mm: a, carapace and rostrum, lateral view; b, carapace and rostrum, dorsal view; c, eye; d, segments of antenna; e, flagella of antenna; f, antenna; g, mandible; h, distal segments of molar process of mandible; i, maxillula; j, telson; k, uropods; l, appendix masculina.

ventral margin; dactylus (fig. 8i) robust, about three times as long as maximum width, significantly tapering distally, with pointed slender curved unguis and preterminal dorsal tuft of setae. Fourth and fifth pereopods similar.

Pleopods normal, endopod of second pleopod in male with developed appendix

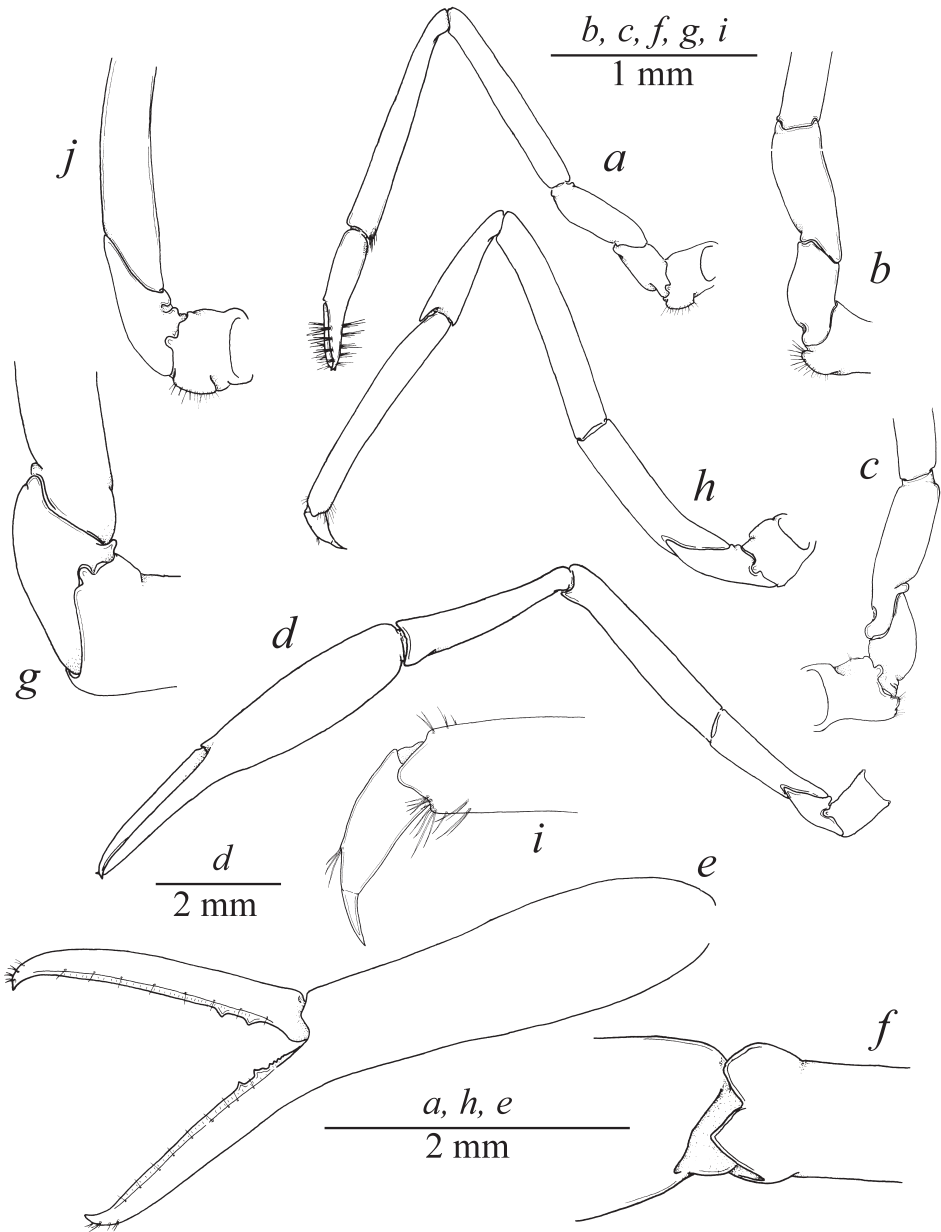


Fig. 8. *Vir longidactylus* spec. nov.: a-k, holotype female, pochl. 3.2 mm: a, first pereiopod; b, c, proximal segments of first pereiopod; d, second pereiopod; e, chela of second pereiopod; f, distal margin of carpus of second pereiopod; g, proximal segments of second pereiopod; h, third pereiopod; i, dactylus of third pereiopod; j, proximal segments of third pereiopod.

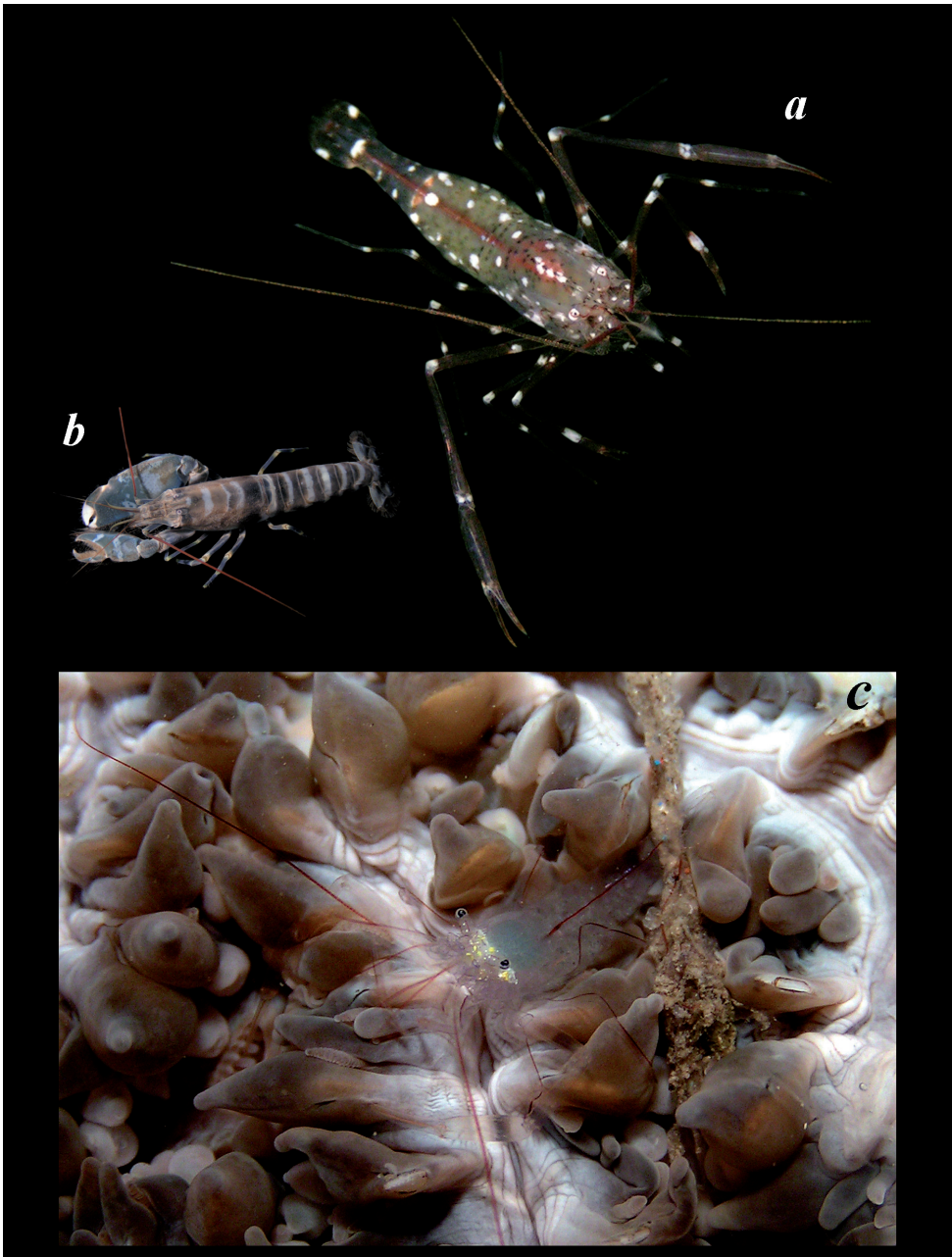


Fig. 9. Coloration of *Palaemonella aliska* spec. nov. (a, paratype female, pochl. 4.3 mm) with burrowing shrimp-host *Alpheus bellulus* Miya & Miyake, 1969 (b, male, pochl. 8.3 mm) and *Vir longidactylus* spec. nov. (c, holotype female, pochl. 3.2 mm).

masculina bearing numerous long simple setae (fig. 7l). Uropods (fig. 7k) slender, exceeding telson; lateral border of uropodal exopod with small distal tooth and mobile spine.

Remarks. — The allotype male is generally similar to described holotype female differing by its smaller size, rostral formula 6/1 and more developed second pereopod.

Colouration. — The body and appendages are translucent. Flagella of antennules and antenna are brown; the third maxilliped and ambulatory pereopods have brown longitudinal lines; the gonads are blue (fig. 9c). The diagnostic feature of the species is four yellow spots on the anterior part of the carapace, by two on each side of the body: on the orbits and on the proximal part of the basal segments of the antennules. This coloration is similar to *Vir smiti* Fransen & Holthuis, 2007 (Fransen & Holthuis, 2007, figs 32, 33) and clearly differing from the coloration of *Vir philippinensis* Bruce & Svoboda, 1984 that is characterized by the presence of blue-red longitudinal lines on all appendages, including the first and second pereopods, and the absence of yellow spots in the anterior part of the carapace.

Etymology. — The species is named referring to the long and slender fingers of the second pereopods in which it clearly differs from all other species in the genus.

Hosts. — The type specimens from Vietnam were collected from *Physogyra lichtensteini* Edwards & Haime, 1851 (Scleractinia: Caryophyllidae); specimens with coloration characteristic for this species known were photographed in Thailand (photo in Marin & Anker, 2005; fig. 9f) and Japan (Okinawa; photo of unknown author, Marin, pers. coll.) on bubble corals *Plerogyra sinuosa* (Dana, 1846) (Scleractinia: Caryophyllidae).

Distribution. — Known from the type locality, Nha Trang Bay, Vietnam. Possibly presents in Thailand and Japan.

Differential diagnosis. — The species clearly differs from all other species in the genus in the sharp molar process of the mandibles, the long and straight fingers of the second pereopods and the low position of the dorsal spines on the telson. The most similar species, *Vir smiti* Fransen & Holthuis, 2007 also shows a low position of the spines on the telson, however, it clearly differs from *V. longidactylus* spec. nov. by the more robust fingers of the second pereopod, the presence of small distoventral spines on the propodus of the third pereopod, and the absence of a sharp molar process on the mandible.

The number of described species of the genus *Vir* is now six. Nevertheless, yet undescribed species have been recorded (for example, see Fransen, 1994; Bruce, 1998; De Grave, 2000; Marin & Anker, 2005; Marin, 2007). Bruce (1998) mentioned *Vir* spec. collected from coral *Pocillopora spec.* in Tuamotu Islands "bearing merus of second pereopod with disto-ventral tooth".

**Key to species of the genus *Vir* Holthuis, 1952 possessing six or more rostral dorsal teeth and a two-segmented mandibular palp (see key in Marin, 2007).**

1. Rami of lateral antennular flagellum with six segments. Propodus of third pereopod about seven times as long as wide, very setose distally. Free-living or associated with pocilloporid corals ..... *Vir orientalis*
- Rami of lateral antennular flagellum with more than ten segments. Propodus of third pereopod about ten-eleven times as long as wide, sparsely setose distally. Symbiotic with caryophyllid corals ..... 2

2. Posterior pair of dorsal telson spines situated close to middle of telson. Propodus of third pereopods with well developed and distinct distoventral spines. Associated with caryophyllid bubble corals *Plerogyra sinuosa* ..... *Vir philippinensis*
- Posterior pair of dorsal telson spines situated in distal third telson. Spines on propodus of third pereopods very small or absent. Associated with caryophyllid corals *Physogyra lichtensteini* ..... 3
3. Dactylus of second pereopods moderately robust, less than five times longer than wide. Propodus of third pereopods with very small distoventral spines ... *Vir smiti*
- Dactylus of second pereopods slender, more than eight times longer than wide. Propodus of third pereopods without distoventral spines . *Vir longidactylus* spec. nov.

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