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Two new species of the genus *Vir* Holthuis, 1952 from Vietnam (Crustacea: Decapoda: Palaemonidae)

Два новых вида рода *Vir* Holthuis, 1952 из Вьетнама (Crustacea: Decapoda: Palaemonidae)

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KEY WORDS: Palemonidae, *Vir*, new species, bubble coral, *Euphyllia*, Caryophyllidae, host specificity, Vietnam.

КЛЮЧЕВЫЕ СЛОВА: Palemonidae, *Vir*, новый вид, *Euphyllia*, Caryophyllidae, специфичность к хозяину, Вьетнам.

ABSTRACT. *Vir euphyllius*, sp.n., and *Vir pareuphylius*, sp.n., are described on the basis of several specimens of both sexes collected from caryophillid corals *Euphyllia spp.* in Nhatrang Bay, Vietnam. The new species differ from *V. philippinensis* Bruce & Svoboda and *V. colemani* Bruce by the less conspicuous colour pattern and a combination of morphological characters, and from the type species, *V. orientalis* (Dana), by the absence of a brush of setae on the third pereiopod. The identity of some specimens identified as *V. philippinensis* or *V. orientalis* by previous workers is briefly discussed.

РЕЗЮМЕ. *Vir euphyllius*, sp.n., и *Vir pareuphylius*, sp.n., описаны на основании нескольких экземпляров обоих полов собранных с кораллов-кариофиллид *Euphyllia spp.* в заливе Нячанг, Вьетнам. Новые виды отличаются от *V. philippinensis* Bruce & Svoboda и *V. colemani* Bruce менее яркой окраской и комбинацией морфологических признаков, а от типового вида рода *V. orientalis* (Dana) отсутствием пучков щетинок на третьих переоподах. Представлено обсуждение достоверности определений некоторых экземпляров *V. philippinensis* и *V. orientalis*, опубликованных в предыдущих работах других авторов.

Introduction

The shrimps of the pontoniine genus *Vir* Holthuis, 1952 are familiar to most scuba divers and underwater photographers. These fragile-looking, mostly transparent shrimps are among the most frequently photographed Indo-West Pacific marine shrimps. Previously, only three species were known in this genus: the type species, *V. orientalis* (Dana, 1852), *V. philippinensis* Bruce & Svoboda, 1984, and the recently described *V. colemani* Bruce, 2003. During an extensive sampling of symbiotic shrimps in Nhatrang Bay, southern Vietnam, the senior author (IM) collected several specimens of *Vir* from bubble corals, *Euphyllia* spp. (Caryophyllidae, see Veron & Stafford-Smith, 2000; Euphylliidae according to other sources). These specimens belong to two species that differ from the three previously described *Vir* species. Therefore, we herewith describe them as new.

Material and methods

All specimens were collected by scuba diving, with a small hand net, in Nhatrang Bay, Vietnam, in 2003 and 2004, and were preserved in 70% ethanol. All drawings were made under a dissecting microscope with the help of a camera lucida. The carapace length (CL, in mm) is used as a standard measurement of size, and was measured along the midline from the tip of the rostrum to the posterior dorsal margin of the carapace. The total length (TL, in mm) was measured only in the largest specimen, from the tip of the rostrum to the posterior margin of the telson. The material used in this study was deposited in the collections of the Zoological Museum of the Moscow State University, Moscow, Russia (ZMMU).

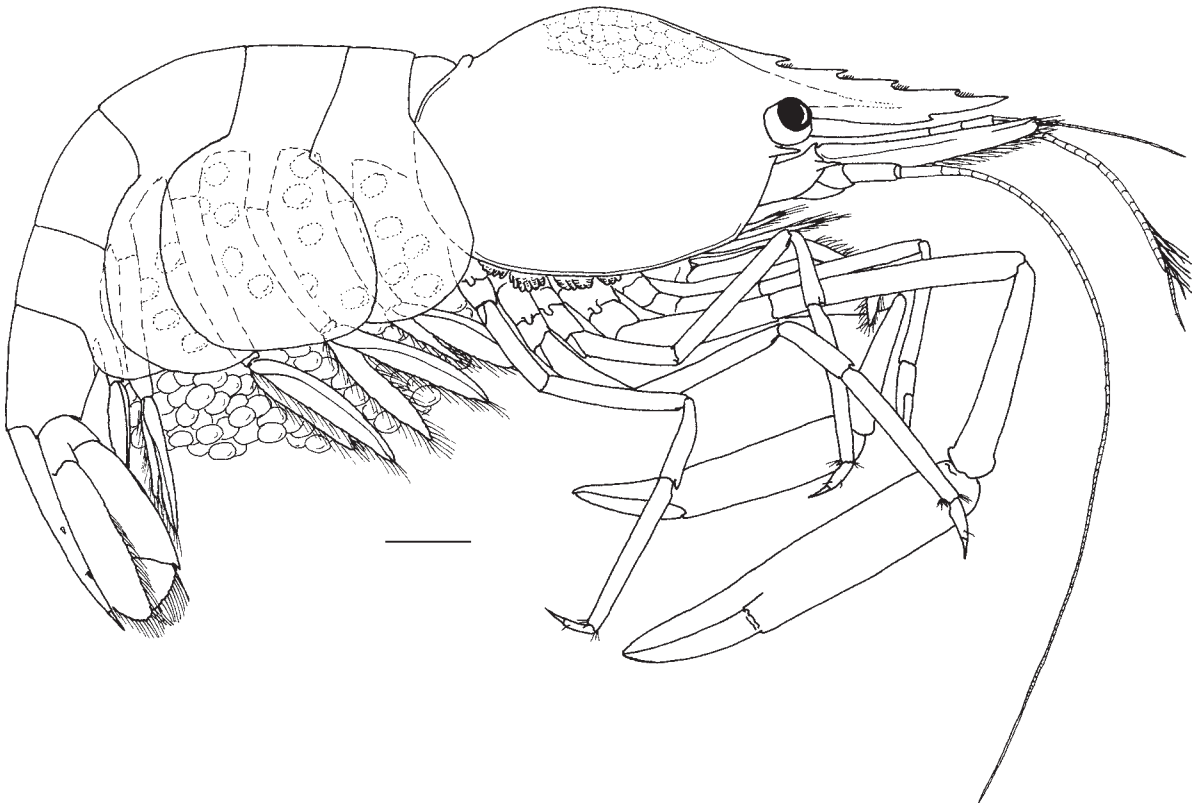

Fig. 1. *Vir euphyllius*, sp.n.: holotype ♀. Scale 1.0 mm.
Fig. 1. *Vir euphyllius*, sp.n.: голотип, ♀. Масштаб 1,0 мм.

TAXONOMIC PART

Family Palaemonidae Rafinesque, 1815

Genus *Vir* Holthuis, 1952

Vir euphyllius, **sp.n.**
Figs 1–5.

TYPE MATERIAL. Holotype ovig. ♀ (CL 4,0 mm), Vietnam: Nha Trang Bay, Tre I., southern bay, near lighthouse, depth 15 m, on *Euphyllia* cf. *divisa*, scuba, coll. I. Marin, 29.06.2004, ZMMU **00000**. Allotype ♂ (CL 2,8 mm), same data as for holotype, ZMMU **00000**. Paratypes: 1 ovig. ♀ (CL 3,2 mm), 1 non-ovigerous ♀ (CL 3,4 mm), same data as for holotype (infested with abdominal bopyrid), ZMMU **00000**; 1 ovig. ♀ (CL 3,8 mm, dissected), Vietnam: Nha Trang Bay, Tre I., southern bay, near lighthouse, depth 15 m, on *Euphyllia* cf. *divisa* (colony different from that of holotype and allotype) scuba, coll. I. Marin, 29.06.2004, ZMMU **00000**; 1 ovig. ♀ (CL 3,9 mm), Vietnam: Nhatrang Bay: Mun I., southern side, depth 15 m, on *Euphyllia* cf. *divisa*., scuba, coll. I. Marin, 06.10.2003, ZMMU **00000**.

DESCRIPTION. Medium sized pontoniine shrimp. Carapace smooth, conspicuously swollen in females (Figs 1, 2a), only slightly inflated in males. Rostrum well developed, slightly upturned distally, extending beyond distal margin of antennular peduncle (Fig. 3a); lateral lamina feebly developed, continuous with orbital margin posteriorly; dorsal lamina extending posteriorly well behind orbital margin, bearing 1 ventral and 4 dorsal teeth (Fig. 2a), most posterior tooth situated slightly posterior to level of orbital margin; ventral margin slightly concave. Supraorbital, epigastrical and hepatic teeth absent. Orbits feebly developed; inferior orbital angle rounded, slightly projecting. Antennal tooth submarginal, directed horizontally, inserted just below inferior orbital angle. Pterygostomial margin bluntly angular.

Abdominal somites smooth; pleura of 1st to 5th abdominal somites rounded; 1st to 3rd pleura expanded in females (Fig. 1); postero-ventral angle of 6th abdominal somite subacute, postero-lateral angle pointed (Fig. 5g). Telson (Fig. 5g) about twice length of 6th abdominal somite, about 3 times longer than broad anteriorly; lateral margins almost straight; posterior margin about half of anterior width, feebly convex medially; dorsal surface with 2 pairs of small, submarginal spines, anterior and posterior pairs inserted at about 0.6 and 0.8 length of telson, respectively; posterior margin with 1 pair of small postero-lateral spines, 1 pair of elongated, robust intermediate spines and 1 pair of elongated, slender submedian spines; intermediate spines much longer than submedian spines (Fig. 5i).

Eyestalks without specific features, about 1,6 times longer than broad distally, slightly expanded proximally; cornea large, hemispherical, with distinct accessory pigment spot (Fig. 2c).

Antennule with 1st peduncular segment about twice longer than broad; stylocerite acute distally, reaching mid-length of 1st segment (Fig. 3a); antero-lateral margin of 1st segment with acute disto-lateral tooth (Fig. 2e); 2nd segment twice

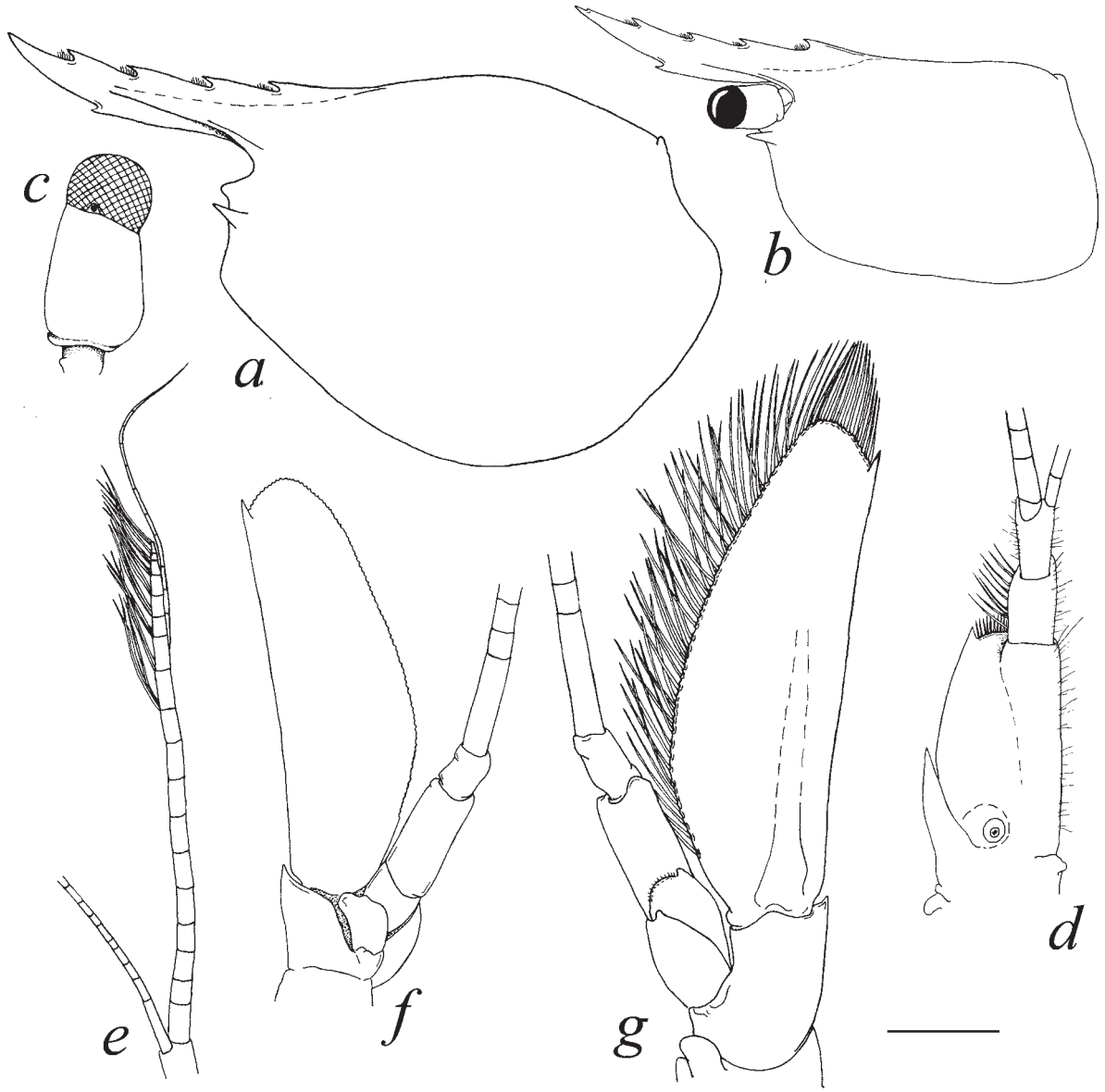

Fig. 2. *Vir euphyllius*, sp.n.: a, c–g — paratype ♀: b — paratype ♂; a, b — carapace; c — eye; d — antennule; e — same, flagella; f, g — antenna, dorsal and ventral views. Scales: 1.0 mm (a, b), 0.5 mm (c – f), 0.4 mm (g).

Рис. 2. *Vir euphyllius*, sp.n.: a, c–g — паратип ♀: b — паратип, ♂; a, b — карапакс; c — глаз; d — антеннула; e — то же, жгутик; f, g — антенна, дорсальный и вентральный вид. Масштаб: 1,0 мм (a, b), 0,5 мм (c–f), 0,4 мм (g).

longer than broad; 3rd segment equal in length to 2nd segment, twice longer than broad; mesial flagellum slender, slightly longer than antennular peduncle; lateral flagellum (Fig. 2d) biramous, with 9 groups of aesthetascs; proximal fused portion consisting of 10–11 segments; shorter ramus with 5–6 free segments; longer ramus more slender, with about 15 segments.

Antenna (Figs 2f, g) with basicerite robust, bearing strong, sharp disto-ventral tooth; scaphocerite about 3 times longer than broad, lateral margin straight or feebly convex, disto-lateral tooth not exceeding distal margin of blade; carpocerite extending far beyond distal margin of antennular peduncle; flagellum relatively slender.

Mouthparts typical for genus. Mandible (Fig. 3b, c) with small, 2-segmented palp, distal segment small, proximal segment with 1 distal seta; corpus robust; incisor process well developed, bearing 3 acute distal teeth and 3 groups of setae in subdistal depression; molar process stout, truncated distally. Maxillula (Fig. 3d) with bilobed palp, ventral lobe larger, with anterior portion curved and acute; dorsal lacinia moderately narrow, with row of stout distal spines; ventral lacinia with distal margin bearing numerous short, stout spines, disto-dorsal margin with several elongated, slender spiniform setae. Maxilla (Fig. 3e) with simple palp; dorsal endite (lacinia) bilobed, distal lobes subequal, furnished with stiff, elongated setae; scaphognathite well developed. First maxilliped (Fig. 3f) with palp bearing 1 long, subdistal seta; caridean lobe well developed, with plumose setae (Fig. 3g); exopod flagellum well developed; coxal endite small,

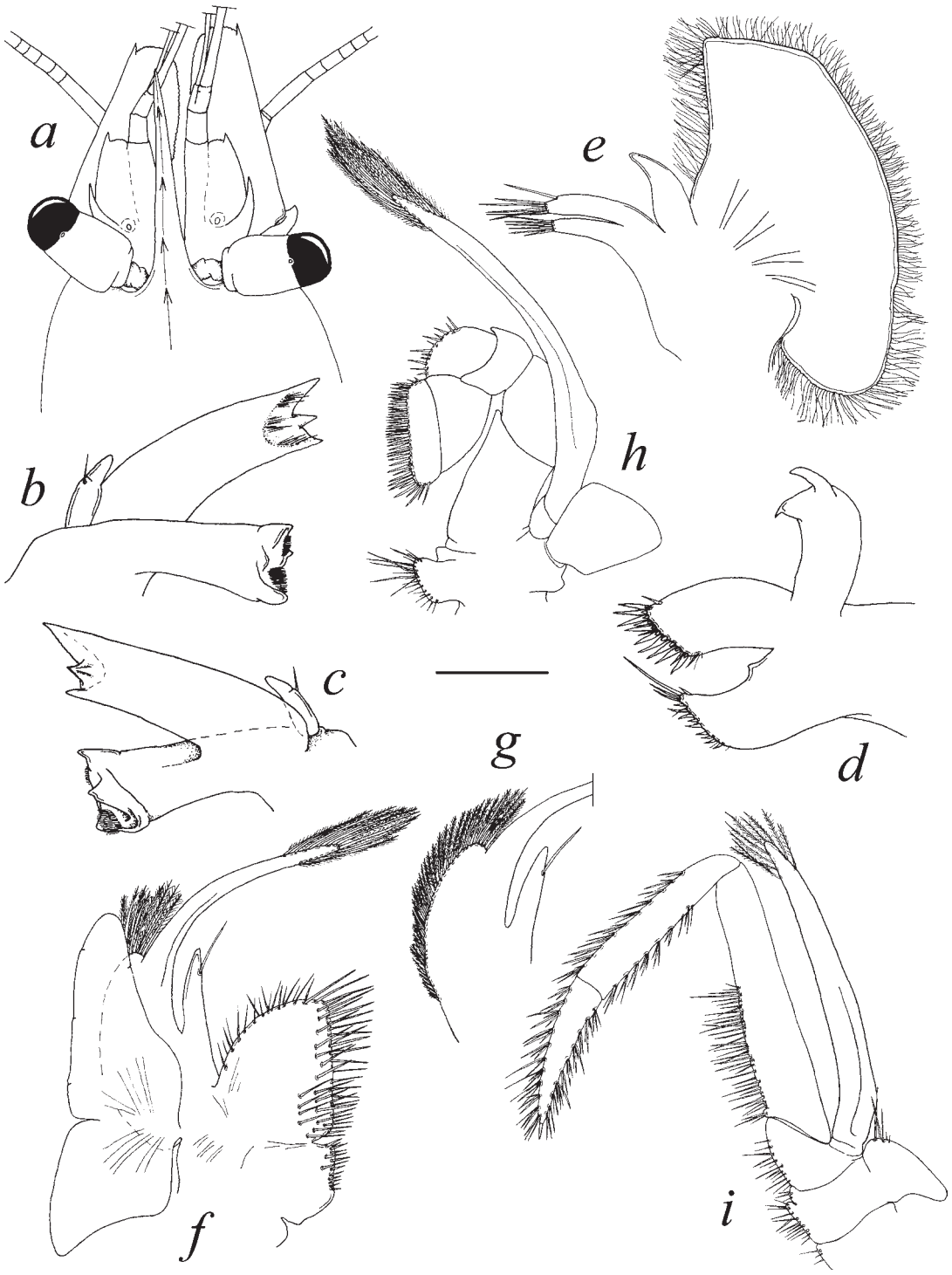

Fig. 3. *Vir euphyllius*, sp.n.: paratype ♀: a — frontal region; b, c — mandibule; d — maxillula; e — maxilla; f — first maxilliped; g — same, caridean lobe; h — second maxilliped; i — third maxilliped. Scales: 1.0 mm (a), 0.4 mm (b–d), 0.5 mm (e–i).

Рис. 3. *Vir euphyllius*, sp.n.: паратип ♀: a — фронтальная часть карапакса; b, c — мандибула; d — максиллула; e — максилла; f — первая максиллепеда; g — то же, каридейная доля; h — вторая максиллепеда; i — третья максиллепеда. Масштаб: 1,0 мм (a), 0,4 мм (b–d), 0,5 мм (e–i).

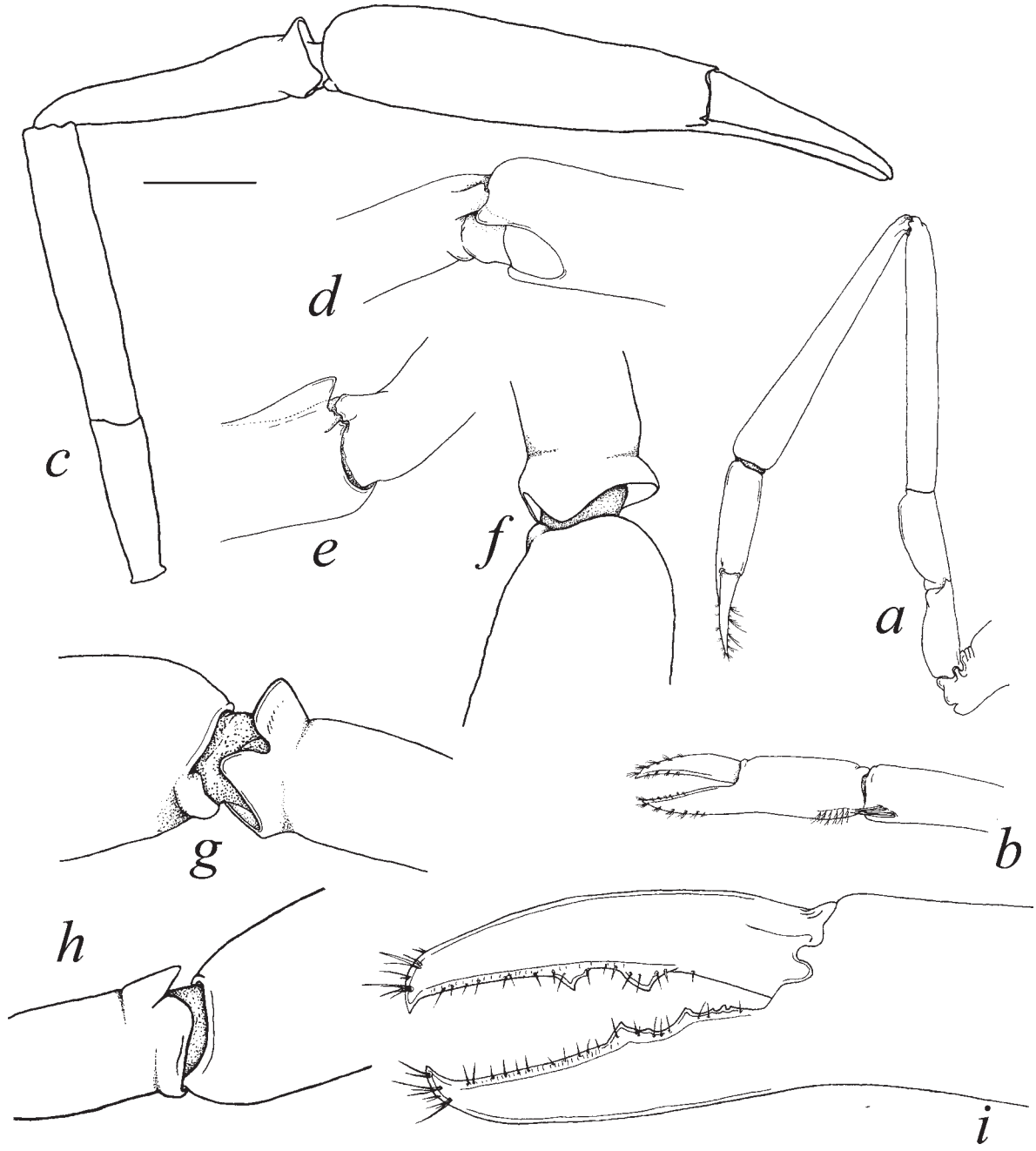

Fig. 4. *Vir euphyllius*, sp.n., paratype: a — first pereiopods; b — same, chela, c — second pereiopods; d, e — same, distal merus; f–h — same, distal part of carpus; i — same, dactylus. Scales: 1.0 mm (a, c), 0.8 mm (b), 0.6 mm (d–h), 0.5 mm (i).

Рис. 4. *Vir euphyllius*, sp.n., паратип: a — первая переопода; b — то же клешня, chela; c — вторая переопода; d, e — то же, дистальная часть меруса; f–h — то же, дистальная часть карпуса; i — то же, дактилусы. Масштаб: 1,0 мм (a, c), 0,8 мм (b), 0,6 мм (d–h), 0,5 мм (i).

with simple setae, separated from basal endite by distinct notch; basal endite large, broad, bearing numerous setae; epipod ear-shaped. Second maxilliped (Fig. 3h) with exopod well developed; coxa bearing small mesial protuberance; disto-lateral margin of propodus broadly rounded, with slender setae; dactylus about 3 times longer than broad, with numerous spines along distal margin; epipod subrectangular.

Third maxilliped (Fig. 3i) slender; coxa with large ear-shaped lateral plate (epipod); basis and ischio-meral segment robust; antepenultimate segment 5.5 times longer than broad, slightly tapering distally; penultimate segment about 5 times longer than broad, about 0.7 times length of antepenultimate segment, with rows of strong, stiff setae; ultimate segment about 4 times longer than broad, about 0.75 times length of penultimate segment, tapering distally, with distal spine and rows of strong spine-like setae mesially; exopod well developed, overreaching the distal margin of the penultimate segment.

First pereiopods (chelipeds) equal in length, similar in shape, slender (Fig. 4a); ischium and basis subequal in form

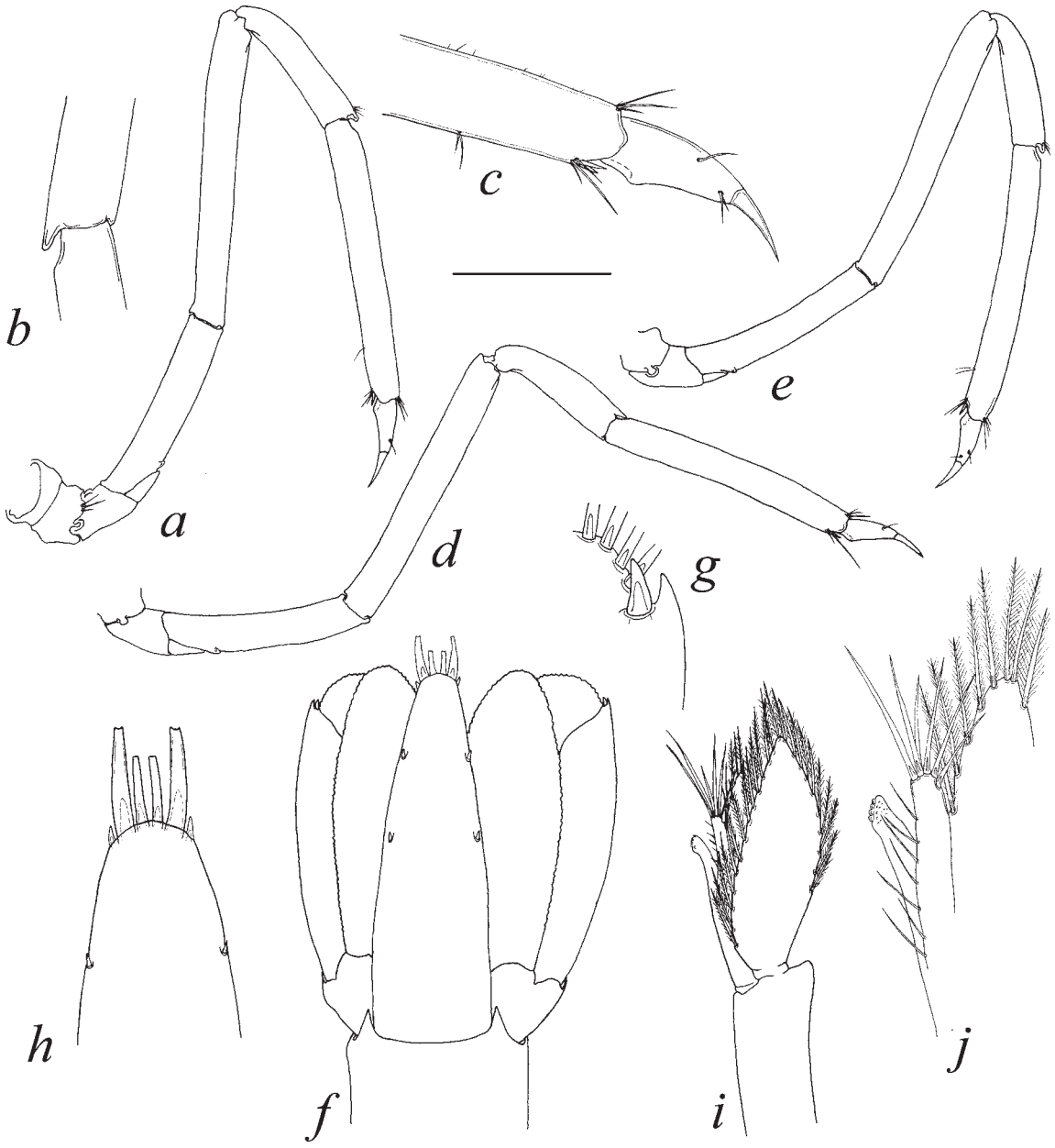

Fig. 5. *Vir euphyllius*, sp.n., paratype ♀ (a–i) and paratype ♂ (j, k): a — third pereiopod, b — same, distal carpus; c — same, distal propodus and dactylus; d — fourth pereiopod; e - fifth pereiopod; f — telson and uropods; g — uropodal exopod, disto-lateral spine; h — telson, distal part; i — second pleopod; j — same, appendix masculina and appendix interna. Scales: 1.0 mm (a, d, e), 0.5 mm (b, c, h), 0.8 mm (f, i), g, j — without scale.

Рис. 5. *Vir euphyllius*, sp.n., паратип ♀ (a–i) и паратип ♂ (j, k): a — третья переопода, b — то же, дистальная часть карпуса; c — то же, дистальная часть проподуса и дактилус; d — четвертая переопода; e — пятая переопода; f — тельсон и уроподы; g — экзопод уропод, дисто-латеральный шип; h — тельсон, дистальная часть; i — второй плеопод; j — то же, appendix masculina и appendix interna. Масштаб: 1,0 мм (a, d, e), 0,5 мм (b, c, h), 0,8 мм (f, i), g, j — без размера.

and length, about 0.7 length of merus; merus about 7.5 times longer than broad, subequal in length to carpus, unarmed distally; carpus 15 times longer than broad at base, widening distally, with row of setae near disto-mesial margin; palm of chela subcylindrical, about 3 times longer than maximum width, with row of 6 tufts of grooming setae near proximo-mesial margin; fingers simple, about 0.8 length of palm, with sharp cutting edges and numerous groups of setae near tips and along cutting edges (Fig. 4b).

Second pereiopods (chelipeds) equal in length, similar in shape (Fig. 4c), much longer and stouter than first pereiopods; basis and coxa robust; ischium about 0.6 length of merus, tapering proximally; merus slender, about 5 times longer than wide, distally with small rounded projection (Fig. 4d, e); carpus slightly shorter than merus, about 6.5 times longer than proximal width, about 0.7 length of palm, widening distally (Fig. 4f); dorso-lateral margin with two rounded lobes (Fig. 4g, h); palm subcylindrical in cross-

section, slender, about 3.5 times longer than maximum width, slightly swollen proximally; fingers about half palm length, with hooked, acute tips; cutting edge of pollex sharp, with 2 large subtriangular and 3–4 small, irregular teeth on proximal half (Fig. 4i); cutting edge of dactylus sharp, with 2 large triangular teeth around mid-length (Fig. 4i), without proximal fossa.

Third pereiopod slender (Fig. 5a), when fully extended exceeding mid-length of scaphocerite approximately by length of dactylus; ischium about 5.5 times longer than broad, unarmed; merus about 7 times longer than broad, about 1.7 times longer than ischium and twice longer than carpus, unarmed; carpus about 4.5 times longer than broad, with disto-dorsal angle triangular, slightly projecting (Figs 5b, c); propodus about 9 times longer than broad, twice longer than carpus, ventral margin without setae or spines, dorsal margin with minute setae and 2 small spines disto-ventrally (Figs 5a, d); dactylus simple, curved, about 0.25 times length of propodus, with distinct angular projection proximally; unguis slender (Fig. 5d). Fourth (Fig. 5e) and fifth (Fig. 5f) pereiopod similar to third pereiopod.

Male second pleopod (Fig. 5j) with appendix masculina exceeding appendix interna; appendix masculina about 4 times longer than wide distally, with 6 slender, apical spines (Fig. 5k); female second pleopod with appendix interna only.

Uropod (Fig. 5g) with exopod about 2.5 times longer than broad, lateral margin convex, with small, acute, subdistal tooth associated with large spine (Fig. 5h); endopod 2.75 times longer than broad, slightly exceeding exopod; both endopod and exopod exceeding posterior margin of telson.

COLORATION. Body and most appendages translucent; conspicuous white stripe present between the eyes; antennal and antennular flagella translucent [IM, pers. obs. underwater].

SIZE. The CL of ovigerous females ranges between 3.2 and 4.0 mm; the single male is significantly smaller with CL 2.8 mm. The largest specimen is an ovigerous female with CL 4.0 mm and TL about 17.0 mm.

ETYMOLOGY. The name of the new species is derived from the generic name of the coral host, *Euphyllia*.

HOST. All specimens of *Vir euphyllius*, sp.n., were collected from colonies of gold-tipped (gold-green) torch coral, *Euphyllia* cf. *divisa* (Veron & Pichon, 1980) (Caryophyllidae). In Nhatrang Bay (southeastern part of Tre I. and Mun I.), *E.* cf. *divisa* form very large colonies, about 1–1.5 m in diameter, usually on sand bottoms under reef-walls. The shrimps occur mostly among the polyp tentacles, but were also frequently observed to move along the lateral surface of the corallites. One large host colony of *E.* cf. *divisa* usually harbours several shrimps of both sexes.

DISTRIBUTION. Presently known only from the type locality, Nhatrang Bay, Vietnam; certainly more widely distributed in the tropical western Pacific and Indian Ocean.

VARIABILITY. The present specimens show little morphological variation, except for the marked sexual dimorphism, which includes the dorsally much more inflated carapace and larger pleura of 1st to 3rd abdominal somites in females. The rostral formula in all males and females is 4/1. As the single male is lacking its second pereiopods, it remains unknown whether these are structurally different from those of females.

REMARKS. *Vir euphyllius*, sp.n., is closely related to the other three species of *Vir*, *V. orientalis, V, philippinensis* and *V. colemani*. The new species differs from *V. orientalis* by the third pereiopod lacking dense setae on the distal portion of the propodus and bearing a much more slender dactylus [Kemp, 1922; Bruce, 1994, 2004]; from *V. philippinensis* by the different rostral formula (7–8/1 in *V. philippinensis*) and shorter and stouter dactylus of the third pereiopod [Bruce & Svoboda, 1984]; from *V. colemani* by a better-developed, 2-segmented mandibular palp (small and not segmented in *V. colemani*) and the stronger dentition on the chela of the second chelipeds [Bruce, 2003]. In life, the new species can be easily distinguished from *V. philippinensis* and *V. colemani* by the colour pattern, e.g., by the transparent antennal flagella, the absence of purple longitudinal bands or spots on the pereiopods, and the presence of a conspicuous white stripe running between the eyestalks.

Vir pareuphyllius, **sp.n.**

Figs 6–8.

TYPE MATERIAL. Holotype ♀ (CL 3.3 mm, dissected), Vietnam: Nha Trang Bay, Tre Is., northern "Bay Tre", depth 7 m, on *Euphyllia* cf. *paraancora*, scuba, coll. I. Marin, 01.10.2003, ZMMU **00000**. Allotype ♂ (CL 2.5 mm), same data as for holotype, ZMMU **00000**.

DESCRIPTION. Medium sized pontoniine shrimp. Carapace smooth, slightly inflated dorsally in female (Fig. 6a), non-inflated in male (Fig. 6b). Rostrum well developed, upturned and tapering distally, extending far beyond distal margin of antennular peduncle (Fig. 6c); lateral lamina feebly developed, continuous with orbital margin posteriorly; dorsal lamina extending posteriorly well behind orbital margin, bearing 0–1 ventral and 5 dorsal teeth (Fig. 6a), most posterior tooth situated slightly posterior to level of orbital margin, anterior tooth feebly developed; ventral margin more or less straight. Supraorbital, epigastrical and hepatic teeth absent. Orbits feebly developed; inferior orbital angle rounded, slightly projecting. Antennal tooth submarginal, directed horizontally, inserted just below inferior orbital angle. Pterygostomial margin bluntly angular.

Abdominal somites smooth; pleura of 1st to 5th abdominal somites rounded; 1st to 3rd pleura expanded in females; postero-ventral angle of 6th abdominal somite subacute, postero-lateral angle pointed (Fig. 6f). Telson (Fig. 6f) about twice length of 6th abdominal somite, about 3 times longer than broad anteriorly; lateral margins almost straight; posterior margin about half of anterior width, feebly convex medially; dorsal surface with 2 pairs of small, submarginal spines, anterior and posterior pairs inserted at about 0.6 and 0.8 length of telson, respectively; posterior margin with 1 pair of small postero-lateral spines, 1 pair of elongated, robust intermediate spines and 1 pair of elongated, slender submedian spines; intermediate spines much longer than submedian spines (Fig. 6g).

Eyestalks without specific features, about 1.5 times longer than broad distally, slightly expanded proximally; cornea large, hemispherical, with distinct accessory pigment spot.

Antennule with 1st peduncular segment about twice longer than broad; stylocerite acute distally, reaching mid-length of 1st segment; antero-lateral margin of 1st segment with acute disto-lateral tooth; 2nd segment twice longer than broad; 3rd segment equal in length to 2nd segment, twice longer than broad; mesial flagellum slender, slightly longer than antennular peduncle; lateral flagellum biramous, with 9 groups of aesthetascs; proximal fused portion consisting of 10–12 segments; shorter ramus with 5–6 free segments; longer ramus more slender, with about 15 segments.

Antenna with basicerite robust, bearing strong, sharp disto-ventral tooth; scaphocerite about 3 times longer than broad, lateral margin straight or feebly convex, disto-lateral

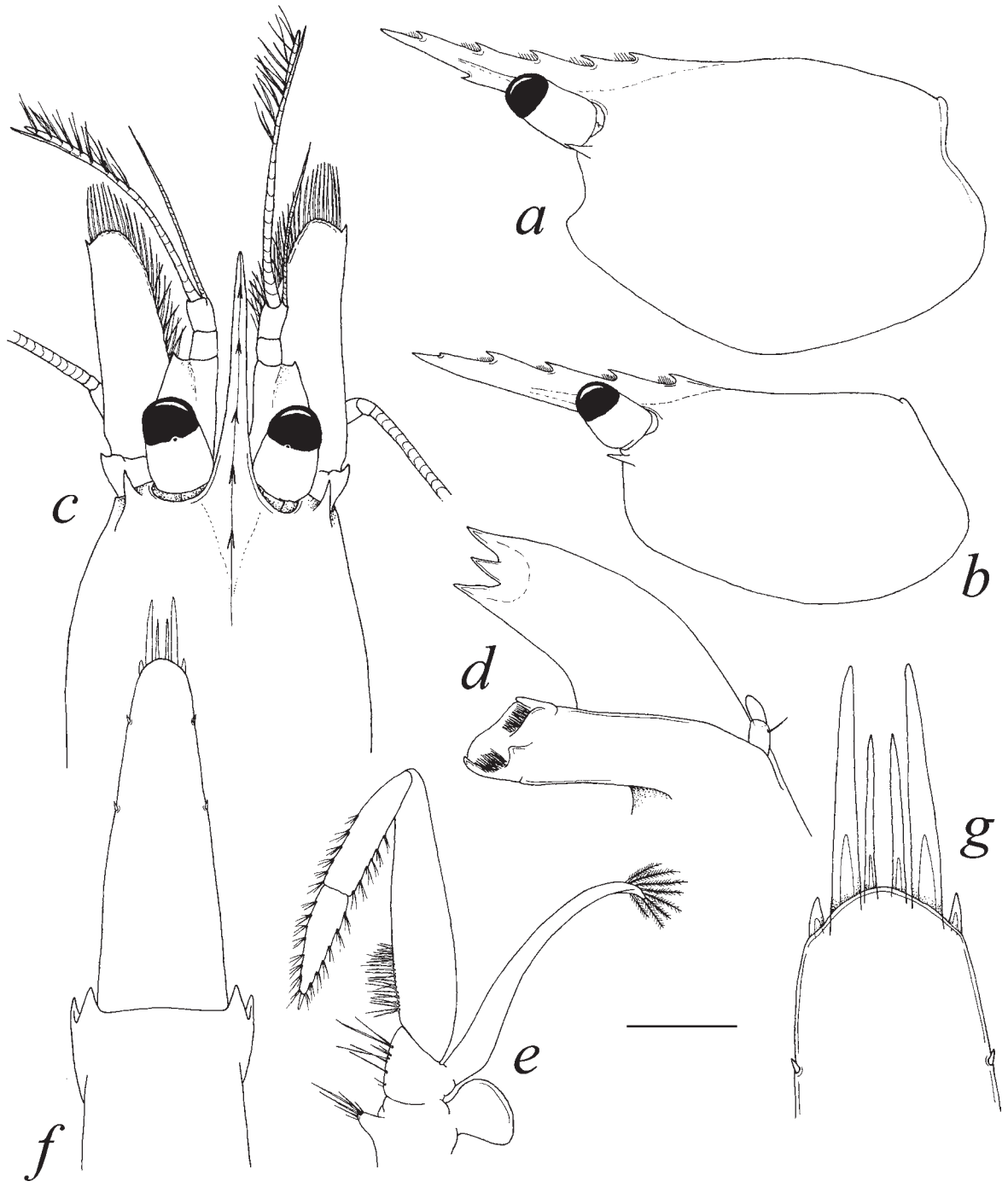

Fig. 6. *Vir pareuphyllius*, sp.n., holotype ♀ (a, c–g) and paratype ♂ (b): a, b — carapace; c — frontal region; d — mandible; e — third maxilliped; f — telson; g — same, distal part. Scales: 1 mm (a, b), 0.9 mm (c), 0.6 mm (e, f), 0.4 mm (d, g).

Рис. 6. *Vir pareuphyllius*, sp.n., голотип ♀ (a, c–g) и паратип ♂ (b): a, b — карапакс; c — фронтальная часть карапкса; d — мандибула; e — третья максиллепеда; f — тельсон; g — то же, дистальная часть. Масштаб: 1 мм (a, b), 0,9 мм (c), 0,6 мм (e, f), 0,4 мм (d, g).

tooth not exceeding distal margin of blade; carpocerite extending far beyond distal margin of antennular peduncle; flagellum relatively slender.

Mouthparts typical for genus. Mandible (Fig. 6d) with small 2-segmented palp, distal segment small, proximal segment with 1 distal seta; corpus robust; incisor process well developed, bearing 3 acute distal teeth and 3 groups of setae in subdistal depression; molar process stout, truncated distally. Maxillula with bilobed palp, ventral lobe larger, with anterior portion curved and acute; dorsal lacinia moderately narrow, with row of stout distal spines; ventral lacinia with distal margin bearing numerous short, stout spines, disto-dorsal margin with several elongated, slender spiniform setae. Maxilla with simple palp; dorsal endite

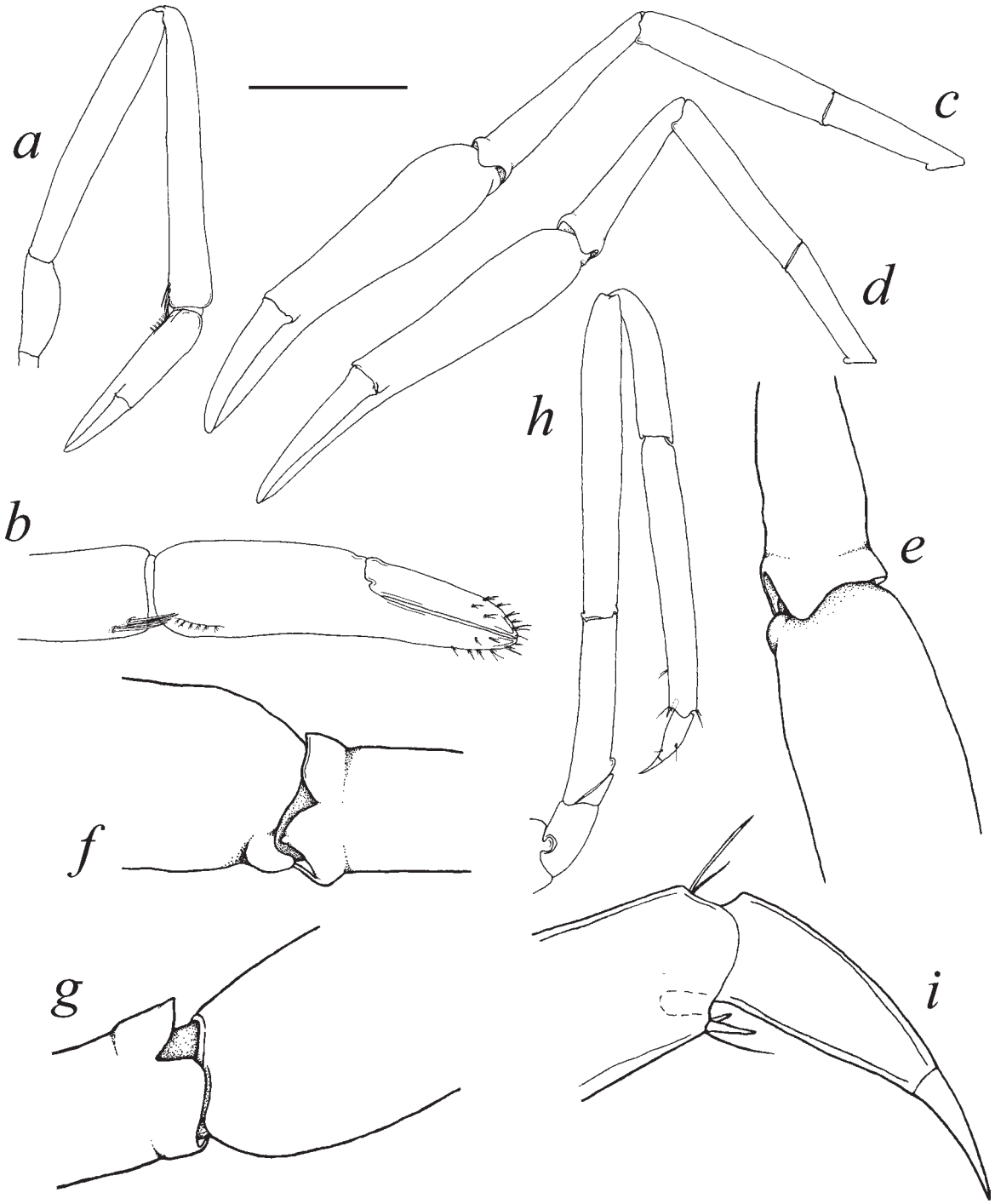

Fig. 7. *Vir pareuphyllius*, sp.n., holotype ♀ (a–c, e–i) and paratype ♂ (d): a — first pereiopod, b — same, chela; c, d — second pereiopod, e–g — same, distal merus from different angles; h — third pereiopod; i — same, dactylus. Scales: 0.8 mm (a, h), 0.5 mm (b, e–g, i), 1.0 mm (c, d).

Рис. 7. *Vir pareuphyllius*, sp.n., голотип ♀ (a–c, e–i) и паратип ♂ (d): a — первая переопода, b — то же, клешня; c, d — вторая переопода, e–g — то же, дистальная часть меруса под разными углами; h — третья переопода; i — то же, дактилус. Масштаб: 0,8 мм (a, h), 0,5 мм (b, e–g, i), 1,0 мм (c, d).

(lacinia) bilobed, distal lobes subequal, furnished with stiff, elongated setae; scaphognathite well developed. First maxilliped with palp bearing 1 long, subdistal seta; caridean lobe well developed; exopod flagellum well developed; coxal endite small, with simple setae, separated from basal endite by distinct notch; basal endite large, broad, bearing numerous setae; epipod ear-shaped. Second maxilliped with exopod well developed; coxa bearing small mesial protuberance; disto-lateral margin of propodus broadly rounded, with slender setae; dactylus about 3 times longer than

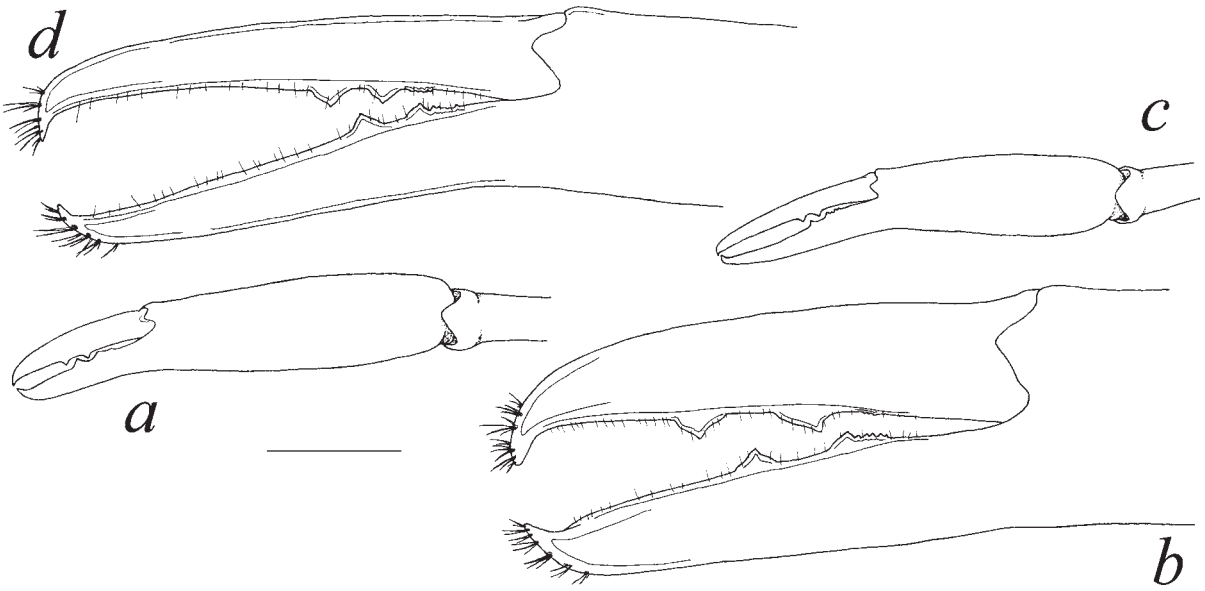

Fig. 8. *Vir pareuphyllius*, sp.n., holotype ♀ (a, b) and paratype ♂ (c, d): a, c — chela of second pereiopod; b, d — same, fingers. Scales: 1.0 mm (a, c), 0.3 mm (c, d).

Рис. 8. *Vir pareuphyllius*, sp.n., голотип ♀ (a, b) и паратип ♂ (c, d): a, c — клешня вторых переопод; b, d — то же, дактилусы. Масштаб: 1,0 мм (a, c), 0,3 мм (c, d).

broad, with numerous spines along distal margin; epipod subrectangular.

Third maxilliped (Fig. 6e) slender; coxa with large ear-shaped lateral plate (epipod); basis and ischio-meral segment robust; antepenultimate segment 4 times longer than broad, slightly tapering distally; penultimate segment about 5 times longer than broad, about 0.7 times length of antepenultimate segment, with rows of strong, stiff setae; ultimate segment about 3.5 times longer than broad, about 0.7 times length of penultimate segment, tapering distally, with distal spine and rows of strong spine-like setae mesially; exopod well developed, overreaching the distal margin of the penultimate segment.

First pereiopods (chelipeds) (Fig. 7a) equal in length, similar in shape, slender; ischium and basis subequal in form and length, about 0.7 length of merus; merus about 8,5 times longer than broad, slightly shorter than carpus, unarmed distally; carpus 15 times longer than broad at base, widening distally, with row of setae near disto-mesial margin; palm of chela subcylindrical, about 3.5 times longer than maximum width, with row of 6 tufts of grooming setae near proximo-mesial margin; fingers simple, about 0.7 length of palm, with sharp cutting edges and numerous groups of setae near tips and along cutting edges (Fig. 7b).

Second pereiopods (chelipeds) equal in length, similar in shape, much longer and stouter than first pereiopods (Fig. 7c); basis and coxa robust; ischium about 0.6 length of merus, tapering proximally; merus slender, about 4,5 times longer than wide, distally with small rounded projection; carpus slightly shorter than merus, about 6 times longer than proximal width, about 0.75 length of palm, widening distally (Fig. 7e); dorso-lateral margin with two rounded lobes (Figs 7f, g); palm subcylindrical in cross-section, slender, about 3.2 times longer than maximum width, slightly swollen proximally (Fig. 8a); fingers about half palm length, with hooked, acute tips; cutting edge of pollex sharp, with 2 large subtriangular and 3–4 small, irregular teeth on proximal half (Fig. 8c); cutting edge of dactylus sharp, with 2 large triangular teeth around mid-length (Fig. 8c), without proximal fossa.

Third pereiopod slender (Fig. 7h), when fully extended exceeding mid-length of scaphocerite approximately by length of dactylus; ischium about 6 times longer than broad, unarmed; merus about 8 times longer than broad, about 1.7 times longer than ischium and about twice longer than carpus, unarmed; carpus about 4.5 times longer than broad, with disto-dorsal angle triangular, slightly projecting; propodus about 8,5 times longer than broad, twice longer than carpus, ventral margin without setae or spines, dorsal margin with minute setae and 2 small spines disto-ventrally; dactylus simple, curved, about 0.25 times length of propodus, with distinct angular projection proximally; unguis slender (Fig. 7i).

Male second pleopod with appendix masculina exceeding appendix interna; appendix masculina about 4 times longer than wide distally, with 6 slender, apical spines; female second pleopod with appendix interna only.

Uropod with exopod about 2.5 times longer than broad, lateral margin convex, with small, acute, subdistal tooth associated with large spine; endopod 2.75 times longer than broad, slightly exceeding exopod; both endopod and exopod exceeding posterior margin of telson.

COLORATION. Body and most appendages translucent, covered with numerous minute purple-red chromatophores; conspicuous white stripe present between the eyes; eyes with two minute pink-red stripes anteriorly; antennal and antennular flagella translucent, without purple chromatophores; gonads white; eggs translucent (Fig. 9a).

SIZE. The CL of the two known specimens is 2.5 and 3.3 mm. The TL of the larger female holotype is about 15 mm.

ETYMOLOGY. The name of this new species refers to its close affinities with *V. euphyllius*, sp.n.

HOST. The two specimens of *V, pareuphyllius*, sp.n., were collected from colonies of the branching (or green)

hammer coral, *Euphyllia* cf. *paraancora* Veron, 1990 (Caryophyllidae).

DISTRIBUTION. Presently known only from the type locality, Nhatrang Bay, Vietnam; certainly more widely distributed in the tropical western Pacific and Indian Ocean.

VARIABILITY. The male paratype lacks a ventral tooth on the rostrum (Fig. 6b) and has more robust second pereiopods, with teeth stouter and positioned more distally (compare Figs 8a, b and Figs 8c, d). Other differences between male and female are related to sexual dimorphism, and include dorsally more inflated carapace and larger pleura of 1st to 3rd abdominal somites in females.

REMARKS. As its name suggests, *V. pareuphyllius*, sp.n., is very closely related to the above-described *V. euphyllius*, sp.n. It differs from *V. euphyllius*, sp.n., only by the more slender, distally tapering rostrum, with ventral margin straight (vs. curved in *V. euphyllius*, sp.n.; cf. Figs 6a, b and 2a, b); slightly different rostral formula (5/0–1 vs. 4/1 in *V. euphyllius*, sp.n.); different configuration of lobes on the distal margin of carpus of the second pereiopods; and a smaller palp on the mandible. The colour patterns of *V. euphyllius*, sp.n. and *V. paraeuphyllius*, sp.n., are apparently similar, making the two species difficult to distinguish underwater [IM, pers. obs.]. *Vir pareuphyllius*, sp.n., can be separated from *V. orientalis, V, philippinensis* and *V. colemani* by the same criteria as *V. euphyllius*, sp.n. (see above).

Because morphological differences between *V. euphyllius*, sp.n. and *V. paraeuphyllius*, sp.n. are slight and colour differences not obvious, and because only two specimens of the latter species are available, the validity of *V. paraeuphyllius*, sp.n., may be questioned [S. De Grave, pers. comm.; C. H. J. M. Fransen, pers. comm]. For instance, variation in rostrum and distal lobes on the carpus of the second pereiopods is common in pontoniine shrimps [S. De Grave, pers. comm]. But on the other hand, the two specimens herewith described as *V. pareuphyllius*, sp.n., are slightly different from *V. euphyllius*, sp.n. (see above), and were associated with a different host species, suggesting that they may indeed represent a distinct species. More *Vir* material from *E. divisa*, *E. paraancora* and other *Euphyllia* species will certainly clarify the taxonomic status of *V. pareuphyllius*, sp.n., and either confirm its specific status or show that it is a merely a variation and therefore a synonym of the variable *V. euphyllius*, sp.n. We also hope that in case the two species are distinct, detailed laboratory photographs of living specimens will enable to find subtle differences in colour patterns.

Discussion

The genus *Vir* now includes five described species. The type species, *V. orientalis* is known from the Indian Ocean, e.g., Kenya, Andaman Islands, Seychelles [Kemp 1922; Bruce, 1976; Fransen, 1994], as well as from the western and central tropical Pacific Ocean, e.g., South China Sea, Marianna Islands, Philippines, Papua New Guinea, Australia, Fiji and possibly Hawaii [Dana, 1852; Chace & Bruce, 1993; De Grave, 2000; Davie, 2002]. This completely transparent shrimp [Kemp, 1922] is considered to be a facultative symbiont of acroporid and pocilloporid corals [Chace & Bruce, 1993; Fransen, 1994; Bruce, 1994]. For instance, Fransen [1994] reported *V. orientalis* from *Pocillopora damicornis* (Linnaeus, 1758) and De Grave [2000] from *Acropora* sp. Fransen's [1994] record of *V. orientalis* from *Physogyra lichtensteini* Edwards & Haime, 1851 (Caryophyllidae) refers to another, undescribed species [C. H. J. M. Fransen, pers. comm].

Vir philippinensis, with its characteristic and conspicuous colour pattern (Fig. 9b, c), is by far the best-known species of *Vir*. This species is known from many Indo-West Pacific localities, including Red Sea (e.g., Eilat, Sudan), Seychelles and Mergui Islands (Myanmar) in the Indian Ocean [Debelius, 2001; Lieske & Myers, 2004; AA, pers. obs.], and Philippines, Indonesia, Vietnam, Ryukyu Islands, Papua New Guinea and Australia in the Pacific Ocean [Bruce & Svoboda, 1984; Bruce & Chace, 1993; Gosliner et al., 1996; Minemizu et al., 2000; Debelius, 2001; Davie, 2002; Kawamoto & Okuno, 2003; AA, pers. obs., see also Figs 9b, c]. Throughout its vast distribution range *V. philippinensis* associates mostly with the bubble coral *Plerogyra sinuosa* (Dana, 1846) (Caryophyllidae) and is therefore known under the popular name "bubble coral shrimp". However, Bruce & Svoboda [1984] reported that the two paratypes of *V. philippinensis* were found on *Fungia* sp. (Fungiidae), and Bruce [1994] stated that this species occurs on *Plerogyra*, *Euphyllia* and *Fungia*.

We have serious doubts that Bruce & Svoboda's [1984] material from *Fungia* identified as *V. philippinensis* actually refers to this species. For instance, the female paratype of *V. philippinensis* differs in several important features form the holotype and allotype, including the much lower number of dorsal teeth on the rostrum (5 vs. 8 in the holotype), the telson with much broader posterior margin and also bearing more spines, and the better developed distal segment of the mandibular palp [Bruce & Svoboda, 1984, fig. 4]. These differences appear to be beyond the normal intraspecific variation, and in our opinion the paratypes of *V. philippinensis* associated with *Fungia* probably belong to another, possibly undescribed species. Similarly, the material from *Euphyllia* [Bruce, 1994] could refer to *V. euphyllius*, sp.n., *V. pareuphyllius*, sp.n., or yet another species.

De Grave [2000] recorded *V. philippinensis* from Hansa Bay, Papua New Guinea. However, De Grave collected his specimens from *Euphyllia glabrescens* (Chamisso & Eysenhardt, 1821) and *Physogyra lichtensteini*, and not from *Plerogyra sinuosa*, the typical host of this species. The rostral formula of De Grave's specimens was 4/1, 5/1, 6/1, 6/3 and 7/2, (vs. 8/1 in the holotype of *V. philippinensis*, see Bruce & Svoboda, 1984). We suspect that De Grave's Hansa Bay material may contain several species (including perhaps the same species recorded as *V. orientalis* from *Physogyra* by Fransen, 1994), and therefore, needs to be carefully re-examined.

The more recently described *V. colemani* appears to be geographically more restricted than *V. orientalis* and *V. philippinensis*. This species is presently known from the type locality, Loloata, Papua New Guinea [Bruce, 2003], northern Sulawesi in Indonesia (Fig.

9d) and Matangi, Fiji [AA, pers. obs.]. The host of *V. colemani* species is also the bubble coral *Plerogyra sinuosa* [Bruce, 2003]. The conspicuous dark purple spots on the second chelipeds and walking legs are species-characteristic. Interestingly, some individuals from Sulawesi (Fig. 9e) have pereiopods (including second chelipeds) with both purple spots (typical for *V. colemani*) and longitudinal lines (typical for *V. philippinensis*, absent in typical *V. colemani*). In other words, the colour pattern of this species appears to be "intermediate" between *V. colemani* and *V. philippinensis*. One photograph from Sulawesi shows two shrimps, possibly a mating pair, of the two colour morphs, the typical *V. colemani* and "intermediate" morph, on the same coral host, [AA, pers. obs., photograph by M. J. Adams]. Whether this "intermediate" colour morph corresponds to a different species, a colour morph of *V. colemani* or a natural hybrid between *V. philippinensis* and *V. colemani*, remains unknown.

The shrimp identified as *Vir* sp. in Minemizu et al. [2000, p. 45], probably from southern Japan, has a colour pattern slightly different from *V. philippinensis*, *V. colemani* and the two new species described in this study. This possibly undescribed species also occurs in Thailand, where it associates with *Plerogyra sinuosa* (Fig. 9f), and on Great Barrier Reef, Australia, where it appears to live on *Physogyra lichtensteini* [AA, pers. obs., photograph by William Heaton].

In conclusion, the pontoniine genus *Vir* likely contains more than five presently known species, and needs further taxonomic work. As for many other pontoniine shrimps, host specificity and colour patterns will certainly prove helpful for species discrimination.

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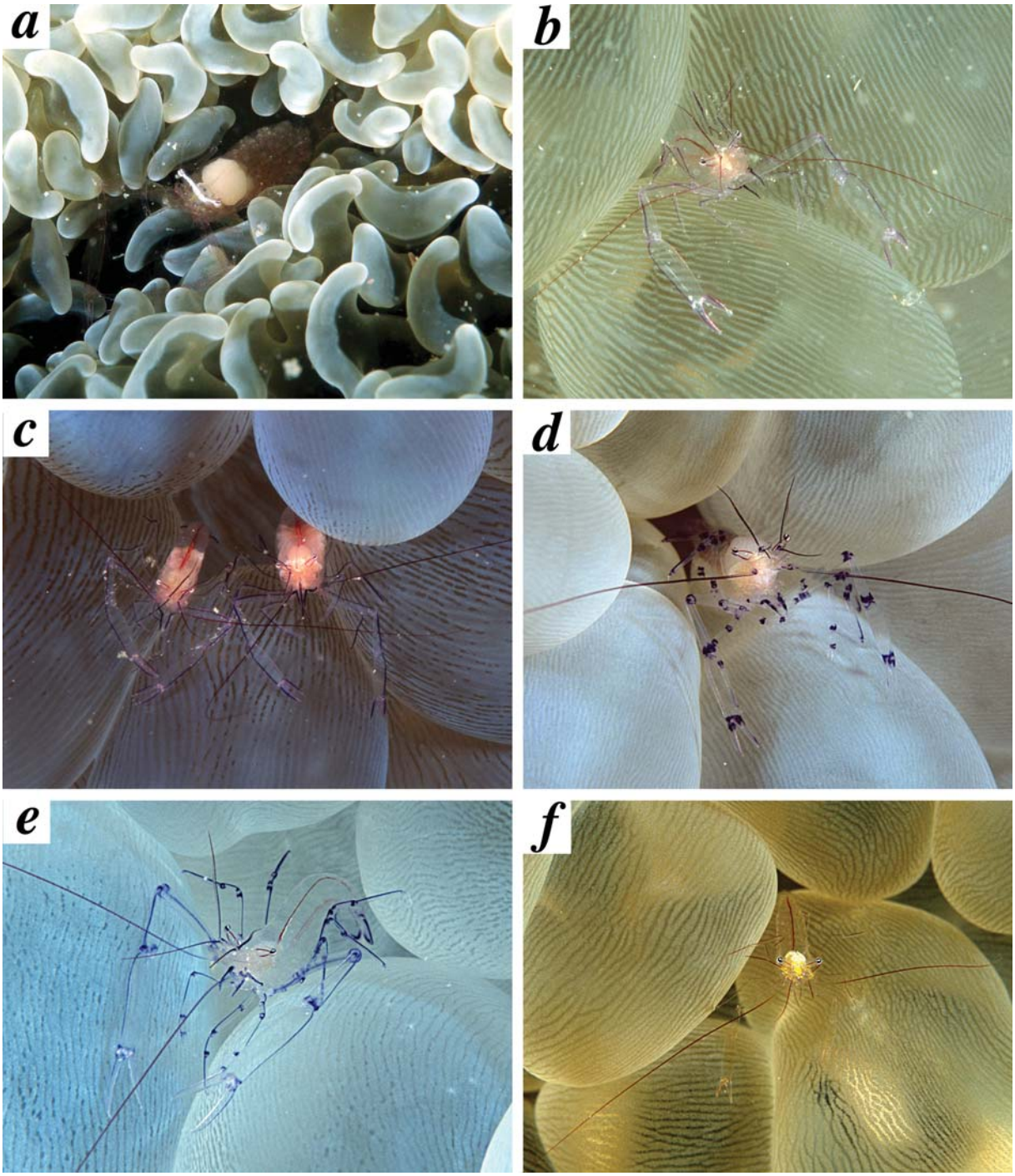

Fig. 9. Colour patterns and hosts of *Vir* species: a — *Vir pareuphyllius*, **sp.n.**, Nhatrang Bay, Vietnam, on *Euphyllia* cf. *parancora*; b, c — *V. philippinensis* Bruce & Svoboda, Nhatrang Bay, Vietnam, ♂ (b) and two ovigerous ♀♀ (c), on *Plerogyra sinuosa*; d — *Vir colemani* Bruce, Sulawesi, on *Plerogyra sinuosa*; e — *Vir* cf. *colemani*, Sulawesi, on *Plerogyra sinuosa*; f — *Vir* sp. (undescribed), Thailand, on *Plerogyra sinuosa* (Photograph credits: a–c — Oleg Savinkin; d–f — Linda Cline).

Рис. 9. Окраска и хозяева видов рода *Vir*: a — *Vir pareuphyllius*, **sp.n.**, залив Нячанг, Вьетнам, на коралле *Euphyllia* cf. *parancora*; b, c — *V. philippinensis* Bruce & Svoboda, залив Нячанг, Вьетнам, ♂ (b) и две ♀♀ (c), на *Plerogyra sinuosa*; d — *Vir colemani* Bruce, Сулавеси, на *Plerogyra sinuosa*; e — *Vir* cf. *colemani*, Сулавеси, на *Plerogyra sinuosa*; f — *Vir* sp. (неописан), Тайланд, на *Plerogyra sinuosa* (Фотографии: a–c — Oleg Savinkin; d–f — Linda Cline).