

**CARIDINA TRIFASCIATA, A NEW SPECIES OF FRESHWATER SHRIMP  
(DECAPODA: ATYIDAE) FROM HONG KONG**

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**ABSTRACT.** – A new atyid species, *Caridina trifasciata*, is described from Hong Kong. Morphological investigations show obvious differences from previously recorded *Caridina* species, and indicate that it belongs to the '*C. serrata* Stimpson (1860) group' of Atyidae.

**KEY WORDS.** – Freshwater shrimp, Atyidae, Hong Kong, *Caridina*, new species.

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**INTRODUCTION**

To date, four species of freshwater shrimps of the family Atyidae have previously been reported from Hong Kong, namely *Caridina serrata* (Stimpson, 1860); *C. lanceifrons* Yu, 1938; *C. cantonensis* Yu, 1938; and *C. apodosis* Cai & Ng, 1999 (see Stimpson, 1860; Kemp, 1918; Dudgeon, 1985; 1987; Cai & Ng, 1999).

During a recent ecological study, an unidentified atyid shrimp species was encountered in two streams in New Territories, Hong Kong. The key characteristic of this unknown species is the presence of three distinctive dark blue bands on its abdomen, which turn deep orange when preserved. Subsequent morphological investigation shows that it is an undescribed *Caridina* species.

Type specimens are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing (IZCAS); Zoological Reference Collection of the Raffles Museum for Biodiversity Research, National University of Singapore, Singapore (ZRC); and Biodiversity Museum, Department of Ecology & Biodiversity, the University of Hong Kong, Hong Kong (HKU). The abbreviation cl is used for carapace length, measured from the postorbital margin to posterior margin of the carapace.

**TAXONOMY**

**FAMILY ATYIDAE**

***Caridina* H. Milne Edwards, 1837**

***Caridina trifasciata*, new species  
(Figs. 1, 3-5)**

**Material examined.** – Holotype – male, cl 3.7 mm (IZCAS), Tsak Yue Wu, New Territories, Hong Kong, coll. R. S. W. Yam, 1 Feb.2001.

Paratypes – 5 females, cl 3.5-4.2 mm (IZCAS), data same as holotype; 5 females, cl 3.8-4.4 mm (ZRC.2003.592), Tsak Yue Wu, New Territories, coll. R. S. W. Yam, 1 Feb.2001; 9 males, cl 3.0-4.0 mm, 4 females, cl 3.5-4.2 mm (ZRC.2003.593), Tsak Yue Wu, New Territories, coll. R. S. W. Yam, 10 Mar.2001; 5 males, cl 2.8-3.3 mm, 5 females, cl 2.6-3.7 mm (ZRC.2003.594), Tsak Yue Wu, New Territories, coll. R. S. W. Yam, 10 Mar.2001; 11 males, cl 2.8-4.0 mm, 2 females, cl 2.9-4.4 mm (HKU), Tsak Yue Wu, New Territories, coll. R. S. W. Yam, 10 Mar.2001; 16 males, cl 2.3-3.8 mm, 11 females, cl 2.8-4.0 mm (HKU), Yi Leng stream, Kau Sai Chau, New Territories, coll. R. S. W. Yam, 29 Mar.2002; 12 males, cl 2.5-3.6 mm, 17 females, cl 3.5-4.4 mm, 5 ovig. females, cl 4.1-4.6 mm, eggs 1.04x0.56 mm (KHU), Tsak Yue Wu, New Territories, coll. R. S. W. Yam, 19 May 2002.

**Description.** – Rostrum short, straight, or slightly sloping down anteriorly, reaching near to end of second segment of antennular peduncle, or slightly beyond it, rostral formula 4+(7-10)/1-4, ventral teeth closely placed at anterior portion. Inferior orbital angle acute, fused with antennal spine; pterygostomial angle sub-rectangular.

Sixth abdominal somite 0.44 times length of carapace, 1.45 times as long as fifth somite, slightly shorter than telson. Telson 2.4 times as long as wide, distal margin rounded, with a median projection, with 4 pairs of dorsal spinules, and one pair of dorsolateral spinules; distal end with 3-4 pairs of spines, lateral pair longer than intermediate pairs. Pre-anal carina lacking spine.

Eyes well developed, anterior end reaching to 0.7 times length of basal segment of antennular peduncle. Antennular peduncle 0.52 times as long as carapace; basal segment of antennular peduncle longer than sum of length of second and third segments, anterolateral angle 0.2 times length of second segment, second segment distinctly longer than third segment. Stylocerite reaching beyond end of basal segment of antennular peduncle, not extending to middle of second segment. Scaphocerite 2.8 times as long as wide.

Incisor process of mandible ending in a row of small teeth, molar process truncated. Lower lacinia of maxillula broadly rounded, upper lacinia elongate, with numerous distinct teeth on inner margin, palp slender. Upper endites of maxilla subdivided, palp short, scaphognathite tapering posteriorly with numerous long, curved setae at posterior end. Distal end of palp of first maxilliped broadly triangular. Second maxilliped typical, arthrobranch well developed. Third maxilliped reaching to end of antennular peduncle, with terminal segment slightly longer than or as long as penultimate segment.

Epipods well developed on first four pereopods. First pereopod reaching to anterior end of eye; merus 2.0-2.2 times as long as broad, as long as carpus; carpus excavated anteriorly, shorter than chela, 1.4-1.5 times as long as high; chela 2.0-2.1 times as long as broad; fingers same length as or slightly shorter than palm. Second pereopod long, reaching to end of scaphocerite; merus distinctly shorter than carpus, 5.1-5.5 times as long as broad; carpus 1.3-1.4 times as long as chela, 5.4-5.9 times as long as high; chela 2.8-3.0 times as long as broad; fingers 1.4-1.6 times as long as palm. Third pereopod reaching to end of antennular peduncle, propodus 9.3-9.5 times as long as broad, 4.2-4.6 times as long as dactylus; dactylus 2.6-2.7 times as long as wide (spines included), terminating in one long claw, 4-5 accessory spines on its flexor margin. Fifth pereopod reaching slightly beyond end of basal segment of antennular peduncle, propodus 11 times as long as broad, 4.5-4.8 times as long as dactylus; long spine at end of propodus extending to or slightly beyond middle of dactylus; dactylus 2.7-3.6 times as long as wide (spinules included), terminating in a single claw, with 29-30 spinules on its flexor margin.

Endopod of male first pleopod subtriangular, 2.6 times as long as wide, not folded backwards, 0.6 times length of exopod, appendix interna extending beyond end of endopod. Appendix masculina of male second pleopod sub-cylindrical, reaching slightly beyond half length of endopod.

Uropodal diaeresis with 18-20 movable spinules.

Ovigerous females with clutch size 6-28 eggs; egg size 0.95-1.04x0.56-0.60 mm.

**Habitat.** – Among 52 streams sampled, *Caridina trifasciata* has, so far, only been found in two streams: Tsak Yue Wu (TYW) (50QKK248793) on Sai Kung Peninsula, and Yi Leng stream (YL) (50QKK235745) on the Kau Sai Chau Island, Sai Kung, New Territories, Hong Kong (Fig. 2). Both streams drain land covered with secondary forest and village houses; and the shrimps were found at elevations of 10-80 meters above sea level. The streams are generally <50 cm deep with beds of sand and gravel patches between large boulders. Both streams had low pH ( $\text{pH}_{\text{TYW}} = 5.4-6.0$  and  $\text{pH}_{\text{YL}} = 5.5-6.2$ ) and high dissolved oxygen concentrations ( $\text{DO}_{\text{TYW}} = 8.2-8.4 \text{ mg l}^{-1}$  and  $\text{DO}_{\text{YL}} = 8.6-8.8 \text{ mg l}^{-1}$ ). The waters were soft (conductivity<sub>TYW</sub> = 39-58  $\text{scm}^{-1}$  and conductivity<sub>YL</sub> = 49-60  $\text{scm}^{-1}$ ) and low in nutrient (nitrates<sub>TYW</sub> = 0.4-0.5  $\text{mg l}^{-1}$  and nitrates<sub>YL</sub> = 0.4-0.7  $\text{mg l}^{-1}$ ; phosphates<sub>TYW</sub> = 0-0.1  $\text{mg l}^{-1}$  and phosphates<sub>YL</sub> = 0-0.1  $\text{mg l}^{-1}$ ). *Caridina trifasciata* lives in shaded pools, especially those where large amounts of leaf litter have accumulated. *Caridina cantonensis* coexists with *C. trifasciata*.

**Colouration.** – Three dark blue bands transverse the body of live shrimp: the first band appear on the posterior end of the carapace; the second band is mostly on the tergum of the third segment of abdomen, with a narrow point extending to pleuron, and the third band on the tergum of the sixth segment of abdomen (Fig.1).



Fig. 1. *Caridina trifasciata*, new species, live specimen, showing the characteristic colour pattern.

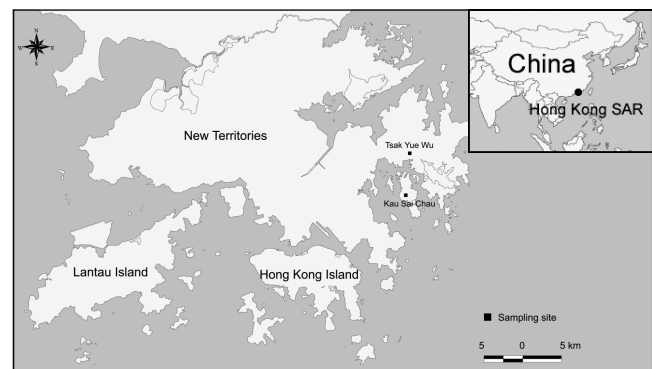


Fig. 2. Map of Hong Kong, showing the collection sites.

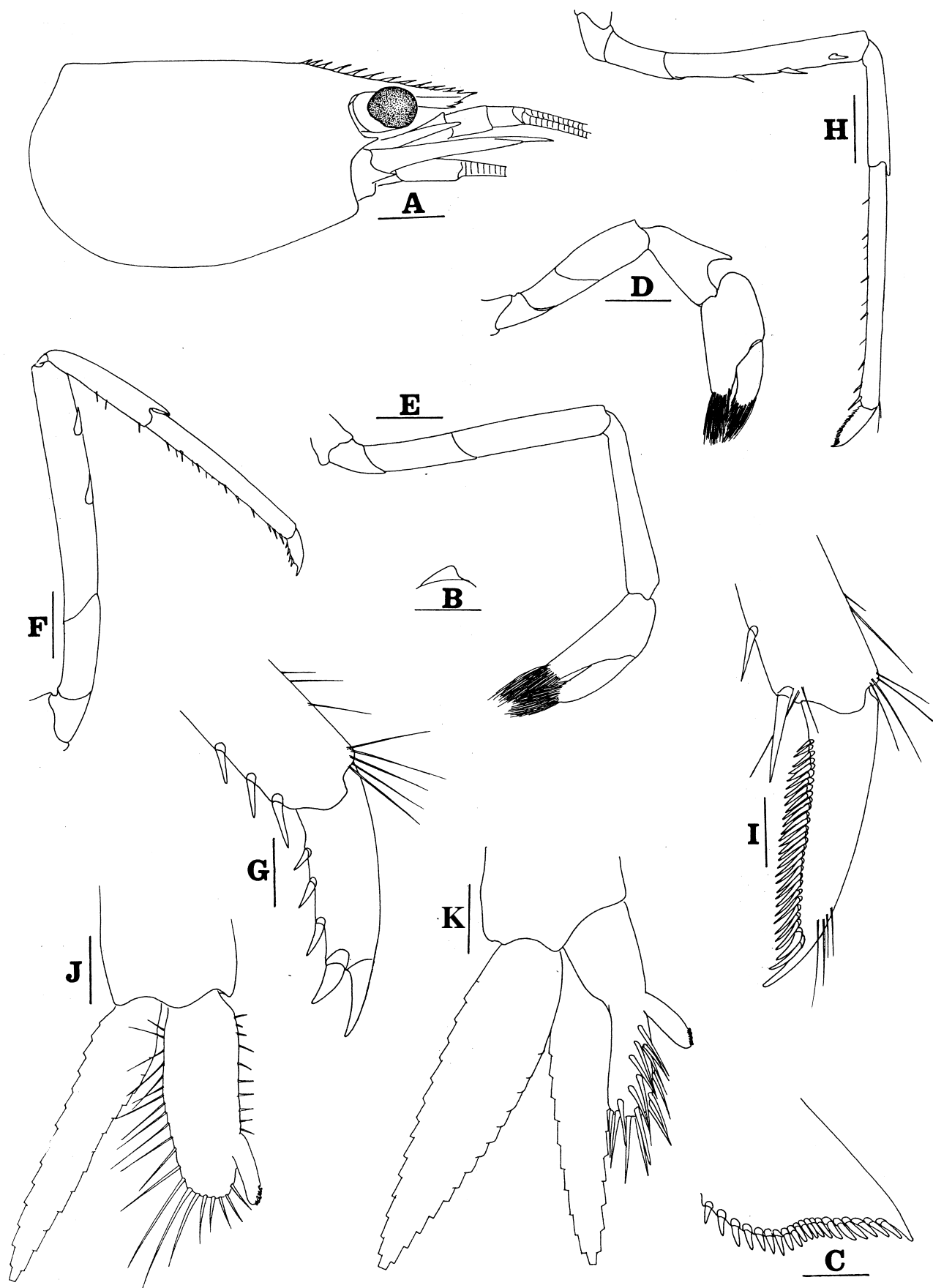


Fig. 3. *Caridina trifasciata*, new species, holotype male (cl 3.7 mm) (IZCAS), Tsak Yue Wu, Hong Kong. A, cephalothorax and cephalic appendages; lateral view; B, preanal carina; C, uropodal diaeresis; D, first pereopod; E, second pereopod; F, third pereopod; G, dactylus of third pereopod; H, fifth pereopod; I, Dactylus of fifth pereopod; J, endopod of male first pleopod; K, appendix masculina of male second pleopod. Scales: A = 1 mm; C, G, I - K = 0.2 mm; B, D - F, H = 0.5 mm; G, I, J = 0.1 mm.

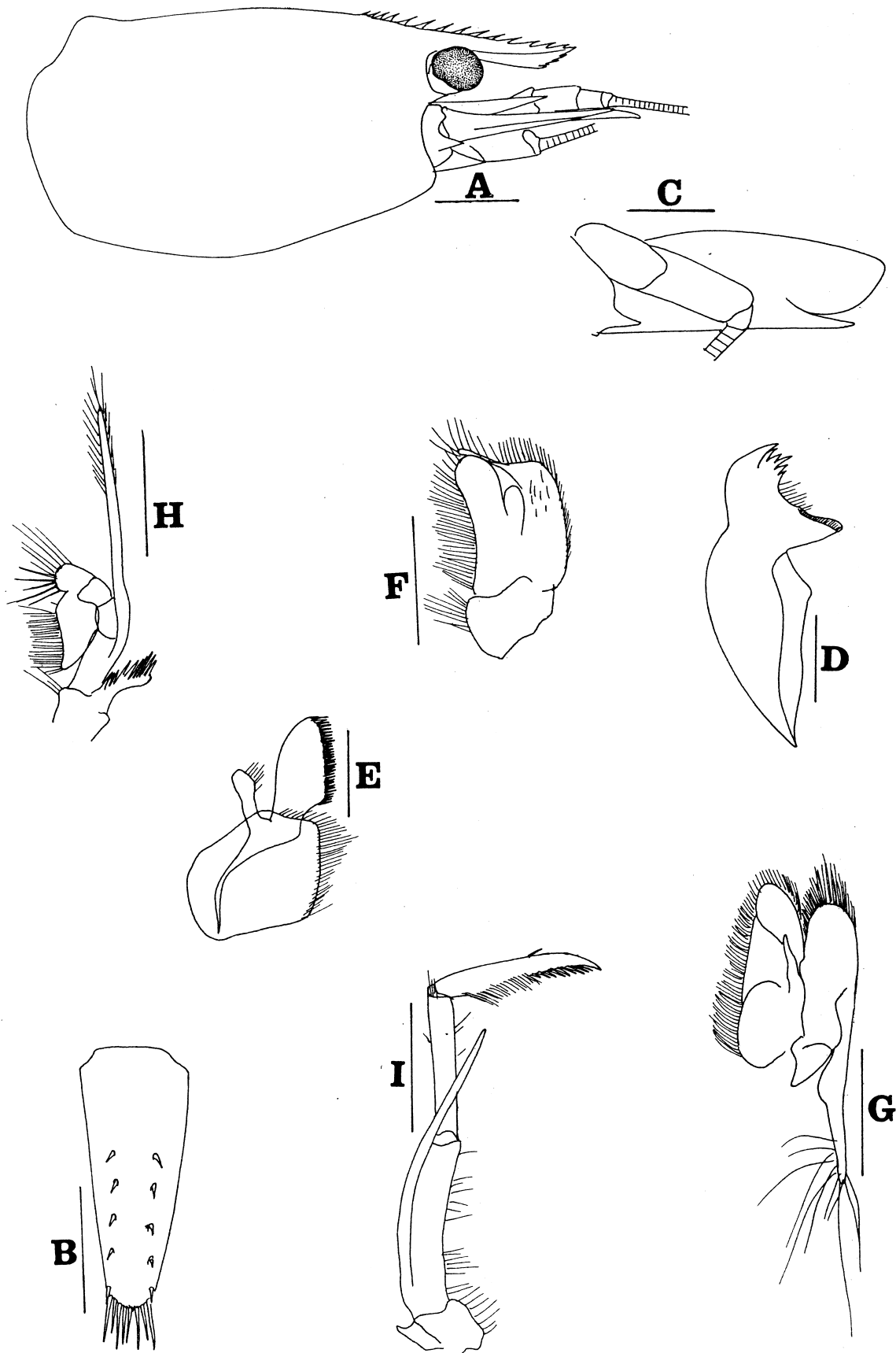


Fig. 4. *Caridina trifasciata*, new species, paratype female (cl 3.6 mm) (ZRC), Tsak Yue Wu, Hong Kong. A, cephalothorax and cephalic appendages, lateral view; B, telson; C, scaphocerite; paratype female (cl 4.2 mm) D, mandible; E, maxillula; G, maxilla; F, first maxilliped; H, second maxilliped; I, third maxilliped. Scales: A = 1 mm; C - E = 0.5 mm; B, F - I = 1 mm.

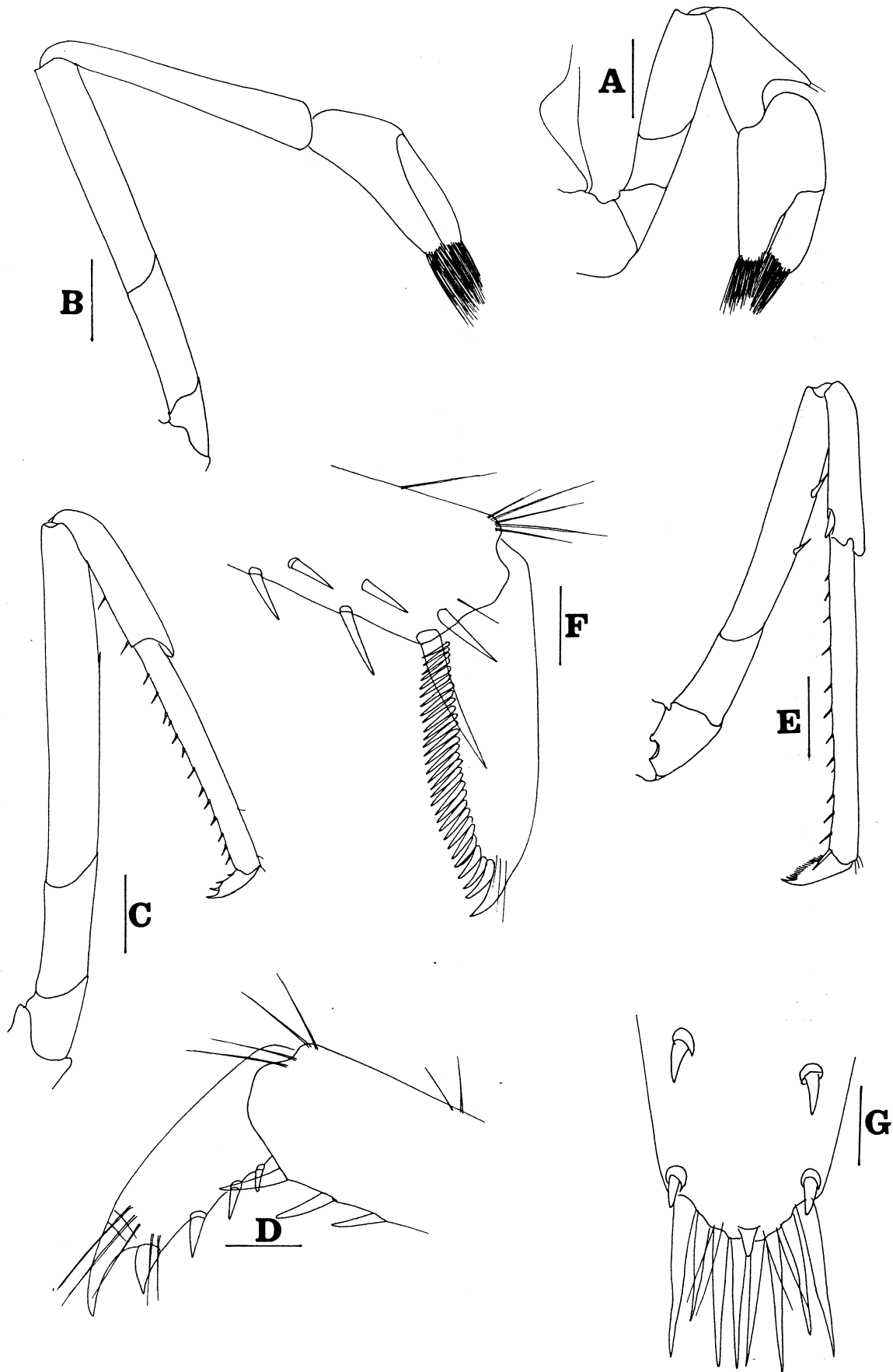


Fig. 5. *Caridina trifasciata*, new species, A-F, paratype female (cl 3.6 mm) (ZRC.), Tsak Yue Wu, Hong Kong; G, paratype male (cl 3.7 mm) (ZRC), Tsak Yue Wu, Hong Kong. A. first pereiopod; B. second pereiopod; C. third pereiopod; D. dactylus of third pereiopod; E, fifth pereiopod; F. dactylus of fifth pereiopod; G. distal end of telson. Scales: A - C, E = 0.5 mm, D, F = 0.1 mm, G = 0.2 mm.

**Etymology.** – The new species name is a combination of two Latin words, *tres* (*tri-*), three, and *fascia*, band, alluding to its unique three band colour pattern.

**Remarks.** – The presence of the long stylocerite, post-orbital teeth, and the large egg size places *Caridina trifasciata* within the *Caridina serrata* species group. It is most similar to *Caridina cantonensis*, the most common atyid shrimp in Hong Kong. The distinctly banded colour pattern, however, clearly separates live *Caridina trifasciata* from other species of *Caridina*. It differs obviously from *C. cantonensis* by the shorter antennular peduncle (0.52 times as long as carapace vs. 0.7 times in *C. cantonensis*); the relatively shorter and narrower rostrum with larger teeth; the broader scaphocerite (2.8 times as long as wide vs. 3.3 times in *C. cantonensis*); the broader merus on first pereiopod (2.0-2.2 times as long as wide vs. 2.7 times in *C. cantonensis*); the longer carpus on second pereiopod (1.3-1.4 times as long as chela vs. 1.2 times in *C. cantonensis*); and, the larger distal spine on the propodus of fifth pereiopod and the unfolded endopod on the male first pleopod. The striking colour pattern of the new species could easily help to distinguish it from other congeners if the specimens are alive, or newly preserved.

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