


## Redescription of *Vellumnus penicillatus* (Gordon, 1930) from Hong Kong and description of a new species from Macclesfield Bank, South China Sea (Crustacea: Brachyura: Pilumnidae)

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### ABSTRACT

The poorly known pilumnid, *Vellumnus penicillatus* (Gordon, 1930), is redescribed by examining the Hong Kong types. A new species, *Vellumnus tki* n. sp., is described from Macclesfield Bank, South China Sea, and it is distinguished from its closest congener, *Vellumnus minabensis* (Sakai, 1969) from Japan, by the setal pattern on the carapace and pereopods, carapace proportions, structure of the front and anterolateral teeth, armature on the chelipeds and relatively shorter ambulatory legs.

### KEYWORDS

Japan, new species, taxonomy, *Vellumnus*, *V. minabensis*, *V. tki*

### INTRODUCTION

*Planopilumnus* Balss, 1933 (type species: *Pilumnus spongiosus* Nobili, 1906) was revised by Ng (2010). He supported the placement of Planopilumnidae Serène, 1984, in Pseudozioidea Alcock, 1898 (also see Ng et al., 2008) and established *Vellumnus* for a group of pilumnid crabs which had been confused with *Planopilumnus* Balss, 1933. Four *Vellumnus* species are currently recognised: *V. labyrinthicus* (Miers, 1884) (type species), *V. minabensis* (Sakai, 1969), *V. penicillatus* (Gordon, 1930) and *V. pygmaeus* (Takeda, 1977a). Ng (2010) noted that *Lazaropilumnus* Števcíć, 2005

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(type species: *Planopilumnus minabensis* Sakai, 1969) was a nomen nudum as no characters were mentioned in the original description and treated it as a junior synonym of *Vellumnus*. *Lazaropilumnus* had previously been listed in the synonymy of *Pilumnus* Leach, 1816, by Ng et al. (2008).

*Vellumnus penicillatus* was described from Hong Kong; it is poorly known and has only been reported once since, from Singapore (Balss, 1938). During a recent visit to the Natural History Museum (NHM), London, the opportunity was taken to re-examine the *V. penicillatus* type material. In this paper, the types of Gordon's species are redescribed and a new species is recognised from the Macclesfield Bank, South China Sea.

Material examined is deposited in the NHM and the Zoological Reference Collection (ZRC), Lee Kong Chian Natural History Museum, National University of Singapore. Measurements provided are in millimetres and are of the maximum carapace width and length, respectively. The following abbreviations are used: coll., collected by; G1, male first gonopods and G2, male second gonopod. The terminology used follows Davie et al. (2015).

## TAXONOMY

### Family Pilumnidae Samouelle, 1819

#### Genus *Vellumnus* Ng, 2010

*Type species.* *Pilumnus labyrinthicus* Miers, 1884, by original designation.

*Remarks.* Of the five *Vellumnus* species originally recognised, Ng (2010) expressed doubt about the assignment of *V. vermiculatus* (A. Milne-Edwards, 1873) to this genus stating that it may require transferring to *Lophoplax* Tesch, 1918. Examination of type specimens as well as material from the West Pacific were examined and the carapace characters show it is closer to *Lophoplax*, notably in the hepatic, gastric, and intestinal regions being swollen and setae covering the surfaces around them (see also Maenosono, 2019; Trivedi et al., 2022). It has since been transferred to this genus (Ng and Rahayu, 2023).

#### *Vellumnus penicillatus* (Gordon, 1930)

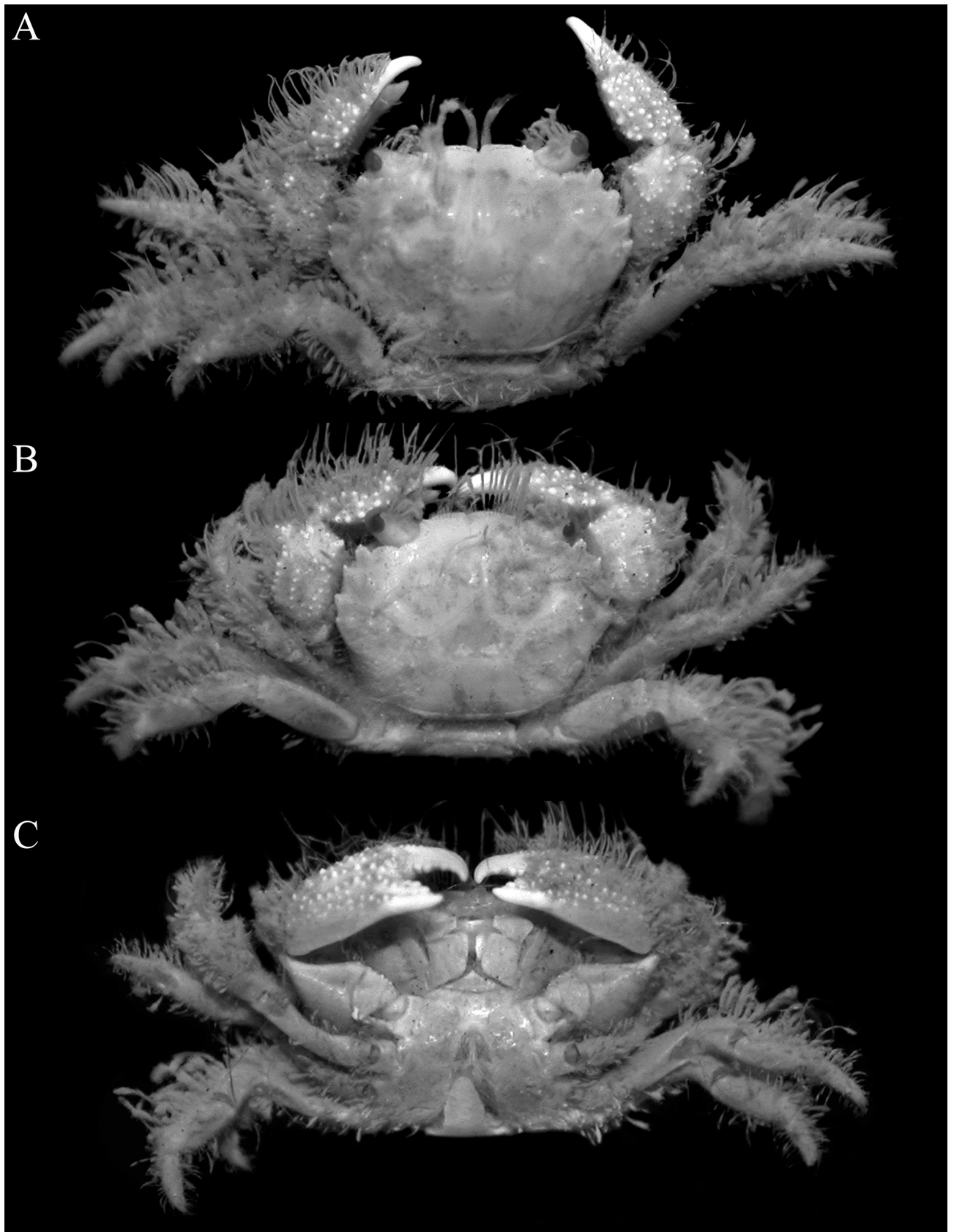
(Figs. 1–3)

*Pilumnus penicillatus* Gordon, 1930: 523. — Gordon, 1931: 542, fig. 18. — Balss, 1933: 12.  
“*Pilumnus*” *penicillatus* — Ng et al., 2008: 142, 145.

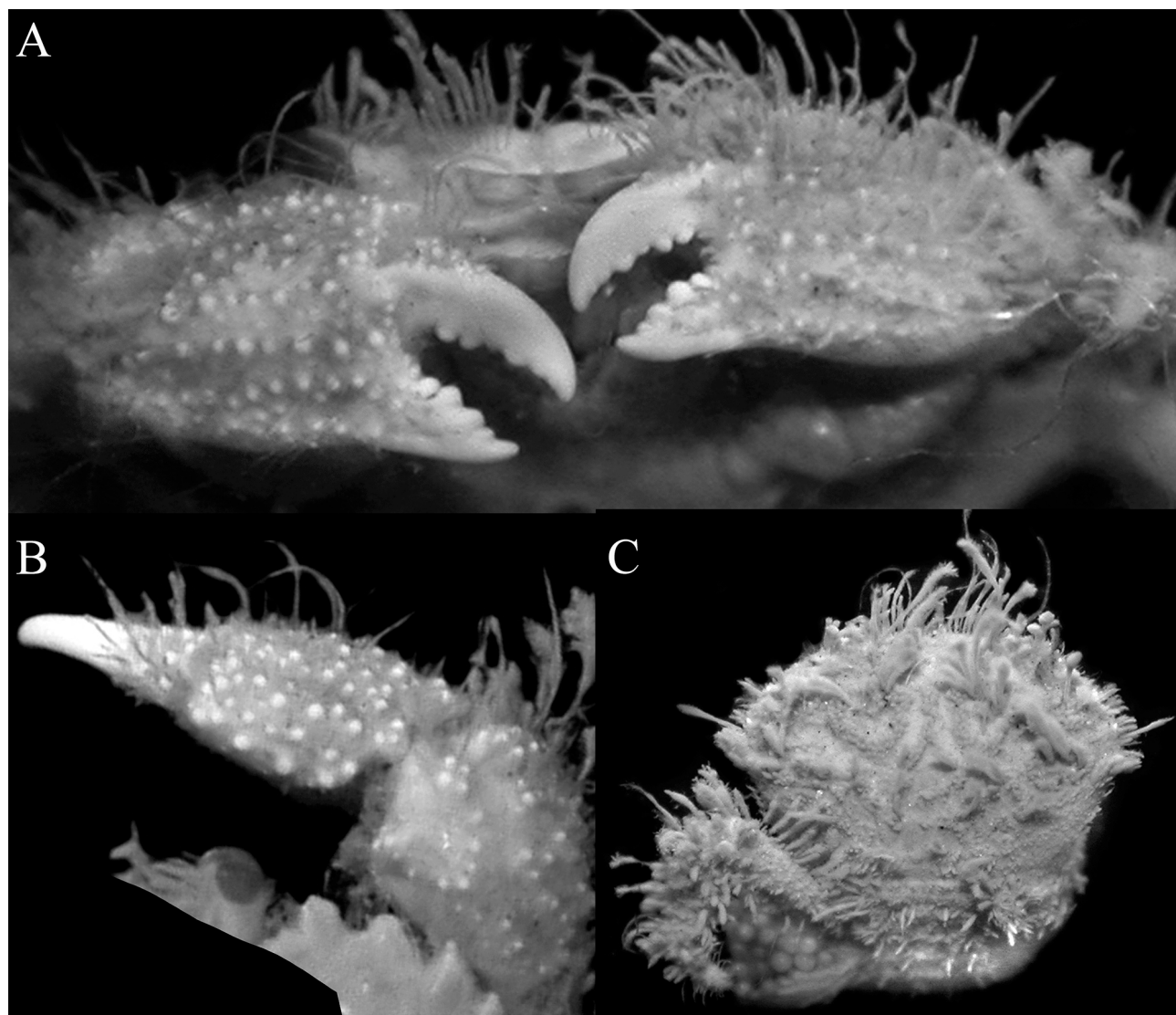
*Material examined.* Holotype female (4.2 × 2.9 mm) (NHM 1930.12.2.123), Hong Kong, Barney collection. Paratypes: male (3.6 × 2.9 mm) (NHM 1930.12.2.124), ovigerous female (5.3 × 3.7 mm) (NHM 1030.12.2.124), same data as holotype.

*Diagnosis.* Carapace hexagonal, wide; surface and pereopods covered with dense, short, soft pubescence as well as scattered long plumose setae completely obscuring margins and surfaces, longer setae arranged in clumps on carapace regions, forming faint circular patterns on gastric regions (Figs. 1A, B, 2C, 3A); epigastric, mesogastric, postorbital cristae low, gastric, subhepatic, branchial regions with scattered low granules (Figs. 1A, B, 2C, 3A); frontal margin gently convex to sinuous, lateral lobe low but distinct; supraorbital margin with prominent median fissure (Fig. 3A–C); external orbital tooth triangular, subtruncate, first anterolateral tooth triangular or bilobed, third tooth smallest (Fig. 3A–C); anteroexternal angle of merus of third maxilliped distinct but not auriculiform, ischium with shallow oblique sulcus (Fig. 3E); outer surface of chelae with numerous round granules, vaguely arranged in longitudinal rows, carpus with numerous round granules, without distinct tooth on inner angle, fingers shorter than palm (Fig. 2A, B); ambulatory legs without distinct crests or ridges; surfaces completely obscured by numerous setae (Figs. 1A–C); anterior thoracic sternum with surfaces relatively smooth, no trace of separation between sternites 3 and 4 except for lateral sutures (Figs. 1C, 3F); tubercle of sterno-pleonal locking mechanism round, on anterior third of sternite 5 (Fig. 3F); male pleon relatively narrow; somite subrectangular, somites 1, 3 subequal in width, telson semicircular (Figs. 1C, 3G); G1 slender, sinuous, distal part bent laterally with sharp tip (Fig. 3H, I).

*Distribution.* Hong Kong (Gordon, 1930).



**Figure 1.** *Vellumnus penicillatus* (Gordon, 1930). **A**, Holotype female (4.2 × 2.9 mm) (NHM 1930.12.2.123), Hong Kong; **B**, **C**, paratype male (3.6 × 2.9 mm) (NHM 1930.12.2.124), Hong Kong. **A**, **B**, overall dorsal view; **C**, ventral view of cephalothorax.



**Figure 2.** *Vellumnus penicillatus* (Gordon, 1930). **A, B**, Paratype male (3.6 × 2.9 mm) (NHM 1930.12.2.124), Hong Kong; **C**, paratype ovigerous female (5.3 × 3.7 mm) (NHM 1030.12.2.124), Hong Kong. **A**, outer view of chelae; **B**, dorsal view of right cheliped; **C**, overall dorsal view.

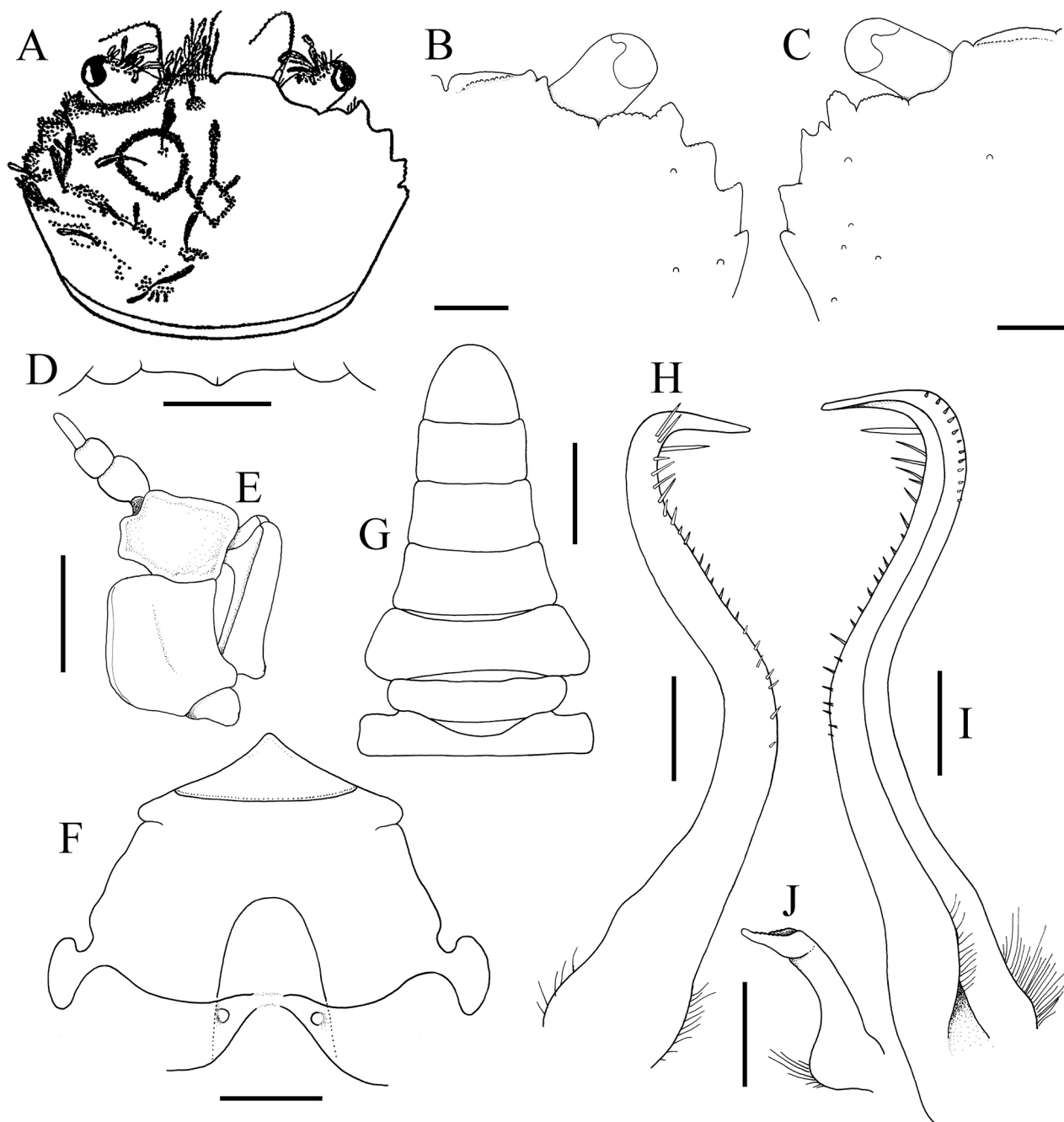
*Remarks.* *Vellumnus penicillatus* is here described in detail with additional figures. The dorsal surface of the carapace comprises dense setae arranged in approximate patterns (Figs. 2C, 3A) but is without underlying ridges, the surface is generally smooth with only scattered granules on the lateral parts (Fig. 1A, B).

Takeda (1977a: 131) listed a number of characters that distinguished *V. penicillatus* from *V. pygmaeus* (type locality: Ogasawara Islands): “the median gastric region is indicated by a longitudinal strand ending in a diamond, a tomentum on each protogastric region forms a circle or ocellus, the areolation beneath the tomentum is only faintly indicated, the carapace is apparently broader with

the nearly truncated second and third anterolateral teeth, the latter of which forms the lateral angle of the carapace, and the male first pleopod bears a strong subdistal spine.” His carapace setal patterns, however, do not appear to be a good character because the original figure by Gordon (1931) is somewhat schematic (present Fig. 3A). The two species, however, are different; in *V. penicillatus*, the supraorbital and anterolateral margins are relatively longer; Fig. 3A–C (vs. supraorbital and anterolateral margins shorter in *V. pygmaeus*; Takeda, 1977a: fig. 5A); the hepatic region and surfaces behind the anterolateral teeth are not swollen, at most with a few granules; Fig. 3A–C (vs. hepatic region with a

prominent swelling posterior to the first anterolateral tooth in *V. pygmaeus*; Takeda, 1977a: fig. 5A); and the G1 is more slender and sinuous with the distal part proportionately longer and more distinctly tapering; Fig. 3H, I (vs. stouter and less sinuous with the distal part shorter in *V. pygmaeus*; Takeda, 1977a: fig. 5B, C).

The specimen from Singapore reported as “*Planopilumnus penicillatus*” by Balss (1938: 60) and “*Vellumnus penicillatus*” by Ng (2010: 51) is not this species. This specimen was re-examined. It appears to be a male in poor condition, being damaged and extremely soft with all the appendages detached.



**Figure 3.** *Vellumnus penicillatus* (Gordon, 1930). **A, B**, Holotype female (4.2 × 2.9 mm) (NHM 1930.12.2.123), Hong Kong; **C–I**, paratype male (3.6 × 2.9 mm) (NHM 1930.12.2.124), Hong Kong. **A**, Carapace (after Gordon, 1931: text-fig. 18a); **B**, left side of denuded carapace; **C**, right side of denuded carapace; **D**, posterior margin of epistome; **E**, left third maxilliped (denuded); **F**, anterior thoracic sternum; **G**, pleon; **H**, right G1 (dorsal view); **I**, right G1 (ventral view); **J**, right G2. Scales: **B–G** = 0.5 mm; **H–J** = 0.2 mm.

It seems to be a young *V. labyrinthicus*. As such, *V. penicillatus* s. str. remains restricted to Hong Kong.

***Vellumnus tki* n. sp.**

(Figs. 4–6)

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*Material examined.* Holotype: male (7.8 × 6.0 mm) (NHM 1932.7.7.22, ex 1893.11.3), Macclesfield Bank, South China Sea, coll. P.W. Bassett-Smith, 1893.

*Diagnosis.* Carapace relatively quadrate (Figs. 4A, 5A); setae on carapace evenly distributed, without ridges or vermiform patterns (Figs. 4A, 5A);

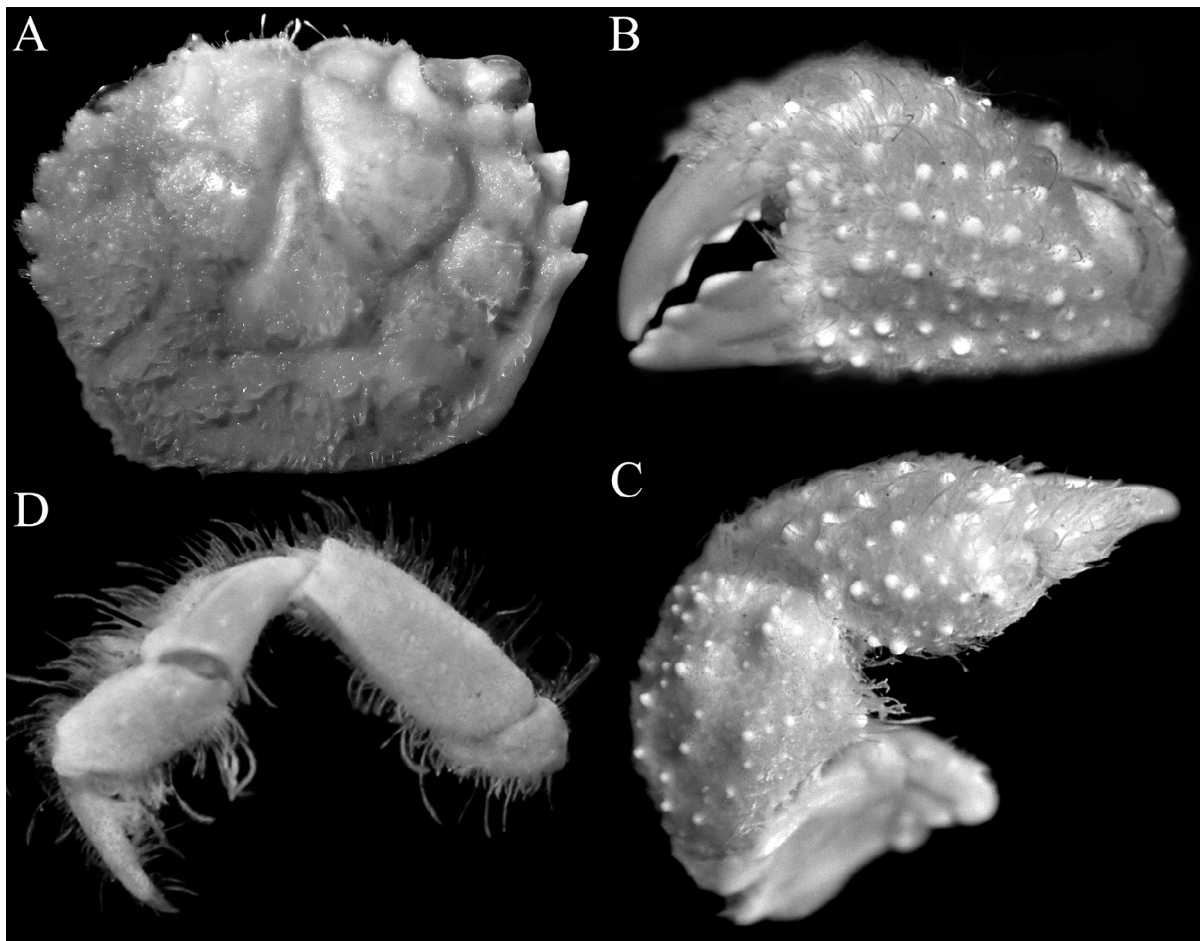


**Figure 4.** *Vellumnus tki* n. sp., holotype male (7.8 × 6.0 mm) (NHM 1932.7.7.22), Macclesfield Bank. A, Overall dorsal view; B, ventral view of cephalothorax.

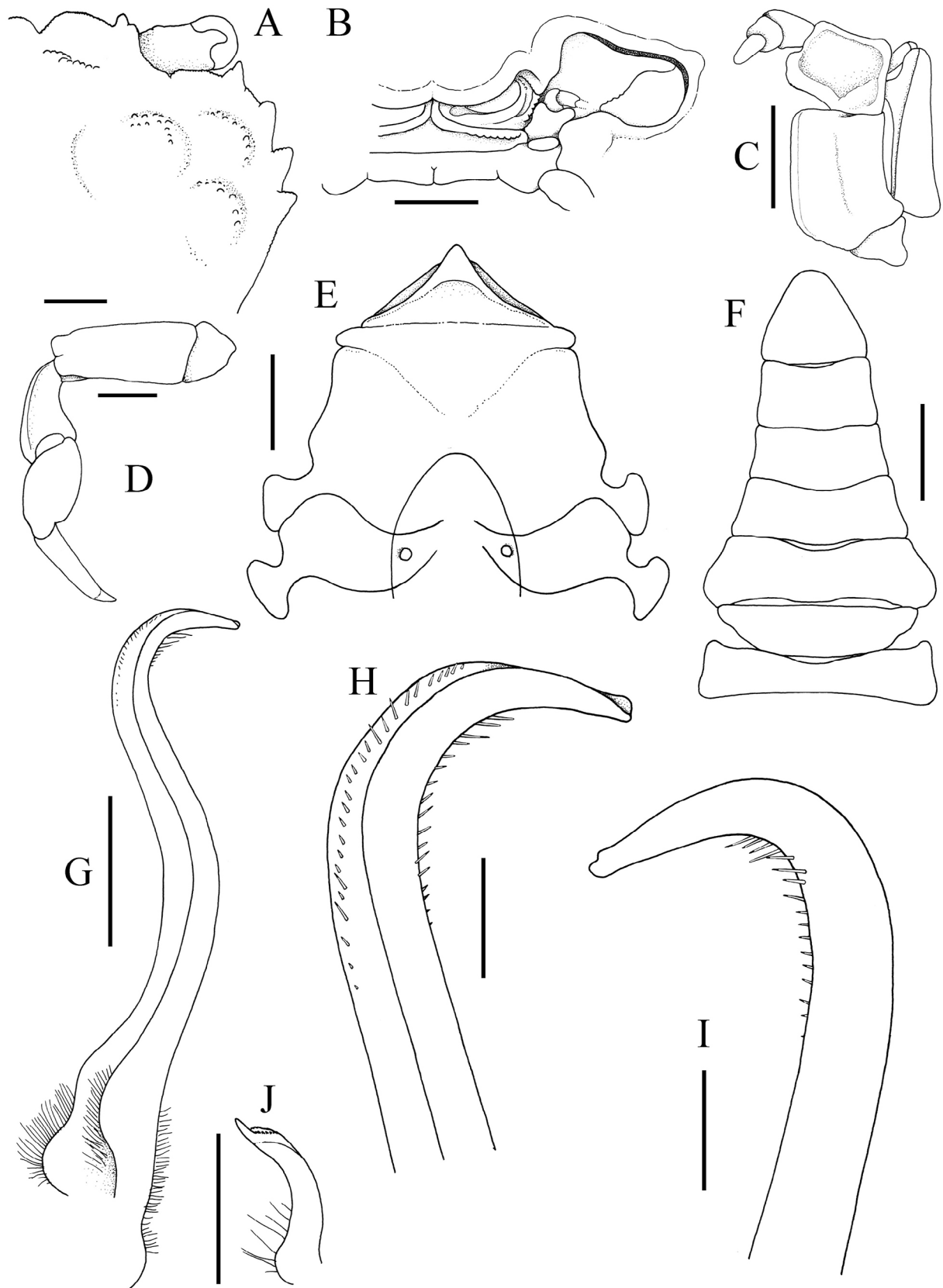
setae on pereopods covered with dense, short, soft pubescence almost completely obscuring margins and surfaces (Figs. 4A, 5A); epigastric, mesogastric, postorbital cristae low, gastric, subhepatic and branchial regions with on anterior margins (Figs. 5A, 6A); frontal margin convex, lateral lobe distinct, bilobed; supraorbital margin with distinct median fissure (Figs. 5A, 6A); external orbital tooth acutely triangular, anterolateral teeth relatively smaller, triangular, third tooth smallest, margins lined with small granules (Figs. 5A, 6A); anteroexternal angle of merus of third maxilliped angular but not auriculiform, ischium with shallow oblique sulcus (Fig. 6C); outer surface of chelae with numerous round granules, vaguely arranged in longitudinal rows, carpus with numerous round granules, without distinct tooth on inner angle, fingers shorter than palm (Figs. 4A, B, 5B, C); ambulatory legs relatively short, without distinct crests or ridges; surfaces completely

obscured by numerous setae (Figs. 4A, B, 5D); anterior thoracic sternum with surfaces relatively smooth, sternites 3, 4 fused with shallow groove and lateral sutures demarcating them (Figs. 4B, 6E); tubercle of sterno-pleonal locking mechanism rounded, on submedian part of sternite 5 (Fig. 3F); male pleon relatively narrow; somite subrectangular, somites 1 and 3 subequal in width, telson subtriangular (Figs. 4B, 6F); G1 slender, sinuous, distal part bent laterally with subtruncate tip forming small flap on dorsal part (Fig. 6H–I).

*Etymology.* This species is named for the High Commissioner of the Republic of Singapore, London, in gratitude for all his support of the natural history digital repatriation project between the Lee Kong Chian Natural History Museum, Singapore, and the Natural History Museum, London. His Excellency Lim Thuan Kuan is known as “TK” to his friends (pronounced “tee-kay”), and is the origin of “*tki*”.



**Figure 5.** *Vellumnus tki* n. sp., holotype male (7.8 × 6.0 mm) (NHM 1932.7.7.22), Macclesfield Bank. **A**, Dorsal view of carapace (right side denuded); **B**, outer view of left chela; **C**, dorsal view of left cheliped; **D**, left fourth ambulatory leg.



**Figure 6.** *Vellumnus tki* n. sp., holotype male (7.8 × 6.0 mm) (NHM 1932.7.7.22), Macclesfield Bank. **A**, Right side of denuded carapace; **B**, front, epistome, antennule, antenna and orbit; **C**, left third maxilliped (denuded); **D**, left fourth ambulatory leg (denuded); **E**, anterior thoracic sternum; **F**, pleon; **G**, left G1 (ventral view); **H**, distal part of left G1 (ventral view); **I**, tip of left G1 (ventral view); **J**, distal part of left G1 (dorsal view); **K**, left G2. Scales: **A–F** = 1.0 mm; **G, J** = 0.5 mm; **H, I** = 0.2 mm.



Remarks. The holotype was examined by Heinrich Balss in June 1932 and identified as “?Lophoplax (*Pilumnoplax*) *sculpta*”, but it is not this pilumnid species (see Takeda, 1977b; Maenosono, 2019; Ng and Rahayu, 2023). Instead, it is considered here to be an undescribed *Vellumnus* species.

In the relatively larger size, (ca. carapace width > 4–5 mm), a more quadrate shaped carapace, distinct carapace areolation, e.g., regions well demarcated, and relatively wider male anterior thoracic sternum, *Vellumnus tki* n. sp. is most similar to *V. minabensis*, but differs in that the carapace is more quadrate in shape, e.g., width to length ratio 1.30; Figs. 4A, 5A (vs. carapace proportionately wider, e.g., width to length ratio 1.4 in *V. minabensis*); the frontal lobe is convex; Figs. 5A, 6A (vs. frontal lobe strongly convex in *V. minabensis*); the regions of carapace have scattered granules only on the anterior margins; Figs. 5A, 6A (vs. regions of carapace covered with numerous granules in *V. minabensis*); the anterolateral teeth are proportionately smaller; Figs. 5A, 6A (vs. anterolateral teeth large and prominent in *V. minabensis*); the granules on the carpus and chela are distinctly more dispersed; Fig. 5B, C (vs. granules on the carpus and chela densely packed in *V. minabensis*); and the ambulatory merus appears to be relatively shorter; Figs. 4A, 5D (vs. ambulatory merus relatively longer in *V. minabensis*; cf. Sakai, 1969: text-fig. 13; Sakai, 1976: text fig. 263, pl. 176, fig. 1). The G1 structures of the two species are similar, with the distal part slightly shorter with the tip more truncate in *V. tki* n. sp.; Fig. 6G–I (vs. longer and more tapering in *V. minabensis*; Sakai, 1969: text-fig. 12a) but this difference is not significant at the species level. The arrangement of setae on the carapace of *V. tki* n. sp. is also different from that of *V. minabensis*. Sakai (1969) described the setae on the carapace of *V. minabensis* as arranged in a “vermiform” manner (Sakai, 1969: 266) but his original figure (Sakai, 1969: text-fig. 13) does not illustrate this character. In a later color figure of the species, however, he showed the vermiform setal pattern (Sakai, 1976: pl. 176 fig. 1). This carapace setation pattern resembles that of *V. labyrinthicus* except that in *V. minabensis*, the carapace is proportionately wider and the anterolateral teeth are relatively weaker and directed obliquely anteriorly (Sakai, 1969: fig. 13; Sakai, 1976: text fig. 263, pl. 176, fig. 1) (vs. carapace

more quadrate, with the anterolateral teeth stronger and directed more laterally; cf. Ng, 2010: figs. 13A, 14A, 15A). The setae on the carapace of *V. tki* n. sp. are evenly distributed (Figs. 4A, 5A) and there are no ridges or vermiform patterns formed.

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## REFERENCES

- Alcock A 1898. Materials for a carcinological fauna of India. No. 3. The Brachyura Cyclometopa. Part I. The family Xanthidae. *Journal of the Asiatic Society of Bengal*, Calcutta, 67(1): 67–233. <https://doi.org/10.5962/bhl.title.16033>
- Balss H 1933. Beitrage zur kenntnis Gattung *Pilumnus* und verwandter Gattungen. *Capita Zoologica*, 4(3): 1–47.
- Balss H 1938. Ueber einige Xanthidae (Crustacea: Decapoda) von Singapore und Umgebung. *Bulletin of the Raffles Museum*, 14: 48–63. <https://lkc.nhm.nus.edu.sg/app/uploads/2017/06/14brm048-063.pdf>
- Davie PJF, Guinot D and Ng PKL 2015. Anatomy and functional morphology of Brachyura. p. 11–163. In: Castro P; Davie PJF; Guinot D; Schram FR and von Vaupel Klein JC (Eds.), *Treatise on Zoology – Anatomy, Taxonomy, Biology. The Crustacea. Volume 9C-I. Decapoda: Brachyura (Part 1)*. Leiden, Boston, Brill. [https://doi.org/10.1163/9789004190832\\_004](https://doi.org/10.1163/9789004190832_004)
- Gordon I 1930. Seven new species of Brachyura from the coasts of China. *Annals and Magazine of Natural History*, (10)6(34): 519–525. <https://doi.org/10.1080/00222933008673240>
- Gordon I 1931. Brachyura from the coasts of China. *Journal of the Linnean Society, Zoology*, 37(254): 525–558. <https://doi.org/10.1111/j.1096-3642.1931.tb02365.x>
- Leach WE 1816. A tabular view of the external characters of four classes of animals, which Linné arranged under Insecta; with the distribution of the genera composing three of these classes into orders, &c. and descriptions of several new genera and species. *Transactions of the Linnean Society of London*, 11(4): 306–400. <https://doi.org/10.5962/bhl.title.119762>
- Maenosono T 2019. Report on nine rare pilumnid crabs (Crustacea: Decapoda: Brachyura) collected from southern Japan, including three new records. *Fauna Ryukyuan*, 48: 19–44. [In Japanese with English abstract] [https://www.researchgate.net/publication/340629602\\_Report\\_on\\_nine\\_rare\\_pilumnid\\_crabs\\_Crustacea\\_Decapoda\\_Brachyura\\_collected\\_from\\_southern\\_Japan\\_including\\_three\\_new\\_records\\_In\\_Japanese\\_with\\_English\\_abstract](https://www.researchgate.net/publication/340629602_Report_on_nine_rare_pilumnid_crabs_Crustacea_Decapoda_Brachyura_collected_from_southern_Japan_including_three_new_records_In_Japanese_with_English_abstract)
- Miers EJ 1884. Crustacea. p. 178–322, pls. 18–32. In: Report on the zoological collections made in the Indo-Pacific Ocean during the voyage of H.M.S. Alert 1881–1882. Part I. The collections from Melanesia. London, British Museum (Natural History). <https://doi.org/10.5962/bhl.title.11669>
- Milne-Edwards A 1873. Recherches sur la faune carcinologique de la Nouvelle-Calédonie, Deuxième Partie. *Nouvelles Archives*

- du Muséum d'Histoire naturelle, Paris, 9: 155–332. <https://doi.org/10.5962/bhl.title.10410>
- Ng PKL 2010. On the Planopilumnidae Serène, 1984 (Crustacea: Brachyura: Pseudozioidea), with diagnoses of two new pilumnoid genera for species previously assigned to *Planopilumnus* Balss, 1933. *Zootaxa*, 2392(1): 33–61. <https://doi.org/10.11646/zootaxa.2392.1.2>
- Ng PKL; Guinot D and Davie PJF 2008. Systema Brachyurorum: Part I. An annotated checklist of extant brachyuran crabs of the world. *Raffles Bulletin of Zoology*, Supplement, 17: 1–286. <https://lknhm.nus.edu.sg/app/uploads/2017/04/s17rbz.pdf>
- Ng PKL and Rahayu DL 2023. Review of the pilumnid crab genus *Lophoplax* Tesch, 1918 from the western Pacific, with descriptions of two new species, and the clarification of the identity of *Pseudocryptocoeloma parvus* Ward, 1936 (Crustacea: Brachyura). *Zootaxa*, 5244(5): 428–454. <https://doi.org/10.11646/zootaxa.5244.5.2>
- Nobili G 1906. Diagnoses préliminaires de 34 espèces et variétés nouvelles, et de 2 genres nouveaux de Décapodes de la Mer Rouge. *Bulletin du Muséum national d'Histoire naturelle*, Paris, 11(6)1905(1906): 393–411. <https://biostor.org/reference/134986>
- Sakai T 1969. Two new genera and twenty-two new species of crabs from Japan. *Proceedings of the Biological Society of Washington*, 82: 243–280. <https://biostor.org/reference/77888>
- Sakai T 1976. Crabs of Japan and the Adjacent Seas. In three volumes; English Text, xxix+773p., Japanese Text, p. 1–461, Plates volume, p. 1–16, pls. 1–251. Tokyo, Kodansha Ltd.
- Samouelle G 1819. The Entomologist's Useful Compendium, or an Introduction to the Knowledge of the British Insects. 496 pp, London, Thomas Boys. <https://doi.org/10.5962/bhl.title.34177>
- Serène R 1984. Crustacés Décapodes Brachyours de l'Océan Indien occidental et de la Mer Rouge. Xanthoidea: Xanthidae et Trapeziidae. Addendum Carpiliidae et Menippidae – A. Crosnier. *Faune Tropicale*, 24: 1–400. <https://decapoda.nhm.org/references/pdfpick.html?id=11789&pdfroot=https://decapoda.nhm.org/pdfs>
- Stevčić Z 2005. The reclassification of Brachyuran Crabs (Crustacea: Decapoda: Brachyura). *Natura Croatica (Fauna Croatica)*, 14(1): 1–159.
- Takeda M 1977a. Crabs of the Ogasawara Islands, V. A collection made by dredging. *Memoirs of the National Science Museum, Tokyo*, 10: 113–140. [https://www.kahaku.go.jp/research/publication/zoology/download/10\\_4/BNSM100403.pdf](https://www.kahaku.go.jp/research/publication/zoology/download/10_4/BNSM100403.pdf)
- Takeda M 1977b. Rediscovery of *Lophoplax sculpta* (Stimpson, 1858) (Crustacea, Decapoda, Brachyura). *Zoological Magazine*, 86: 120–123.
- Tesch JJ 1918. Decapoda Brachyura II. Goneplacidae and Pinnotheridae. *Siboga Expeditie Monographie*, 39c1: 149–295, pls. 7–18.
- Trivedi JK; Patel K, Mitra S and Ng PKL 2022. On the identity of *Myopilumnus andamanicus* Deb, 1989 (Crustacea: Decapoda: Brachyura: Pilumnidae) from India. *Zootaxa*, 5194(4): 595–600. <https://doi.org/10.11646/zootaxa.5194.4.8>

## ADDITIONAL INFORMATION AND DECLARATIONS

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Equal contributions throughout.

### Consent for publication

Not needed.

### Competing interests

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Not relevant.

### Study permits

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