

## A new genus of freshwater crab (Crustacea: Decapoda: Brachyura: Potamidae) from Thailand, with a description of a new species

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(Accepted: 14 May 1999)

A new genus, *Stelomon*, is established for the Thai freshwater crabs *Potamon kanchanaburiense* Naiyanetr, 1992, and *P. pruinosum* Alcock, 1909. The unique structure of the male first pleopod is the key diagnostic generic character. One new species, which differs in the form of the male first pleopod, is also described. A key to the species of *Stelomon* is included.

KEYWORDS: Crustacea, Decapoda, Brachyura, Potamidae, taxonomy, freshwater Thailand.

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### Introduction

The *Potamon* species of Thailand are a very heterogeneous assemblage (Ng and Naiyanetr, 1993). The present paper resolves the taxonomy one of these taxa, *Potamon kanchanaburiense* Naiyanetr, 1992, which Ng and Naiyanetr (1993: 7) noted had an unusual male first pleopod structure. The significance of the differences in its overall G1 structure warrants the establishment of a separate genus, named here as *Stelomon* gen. nov. At the infra-specific level, the terminal segment of the G1 of *S. kanchanaburiense* shows some variation, which is discussed in the present paper. Another species, *Potamon pruinosum* Alcock, 1909, which was previously synonymized under *Potamon (Potamon) rangoonensis* Rathbun, 1904 (as a *Ranguna*), by Bott (1970), is revalidated and also included in the genus *Stelomon*. A third *Stelomon* species, closely resembling *S. pruinosum*, is new to science and described herein as *S. tharnlod* sp. nov.

The following abbreviations are used: G1 for male first pleopod; G2 for male second pleopod. Measurements are of carapace width and length respectively. Terminology used essentially follows Ng (1988b). All measurements are in millimetres. Specimens are deposited in the Zoological Reference Collection (ZRC) of the Raffles Museum, National University of Singapore; Nationaal Natuurhistorische

Museum [formerly Rijksmuseum van Natuurlijke Histoire (RMNH)], Leiden, The Netherlands; Chulalongkorn University Natural History Museum (CUMZ), Bangkok, Thailand; and the Zoological Survey of India (ZSI), Calcutta, India.

## Taxonomy

Family **POTAMIDAE** Ortmann, 1896

### *Stelomon* gen. nov.

*Potamon*: Ng and Naiyanetr, 1993: 6 (part) (not *Potamon* Savigny, 1816).

*Type species.* *Potamon kanchanaburiense* Naiyanetr, 1992, by present designation.

### *Diagnosis*

Carapace distinctly broader than long, dorsal surface relatively flat. Epigastric cristae well-developed, rugose, almost level with postorbital cristae, separated from postorbital cristae by short, narrow groove; postorbital cristae rugose. External orbital angle triangular; epibranchial tooth distinct, triangular; anterolateral margins strongly convex; posterolateral margins strongly convergent posteriorly; branchial region granulose to rugose; metabranchial region with oblique striae. Ischium of third maxilliped rectangular; exopod exceeding distal margin of ischium, with well-developed flagellum. Ambulatory legs normal, not elongate. Suture between thoracic sternites 3 and 4 not visible. Male abdomen triangular. G1 stout, slightly sinuous; terminal segment long, stout, twisted along longitudinal axis, with groove for G2 clearly visible from ventral view, subdistal part appearing pectinated, surrounded by short, stiff setae. G2 distal segment greater than half length of basal segment.

### *Remarks*

*Stelomon kanchanaburiense* (Naiyanetr, 1992), belonged to one of the four groups recognized by Ng and Naiyanetr (1993: 6) among the Thai species of *Potamon*. While retaining it in the genus *Potamon*, Ng and Naiyanetr (1993: 8) also commented on the unusual nature of its G1, adding that, ‘... it might perhaps be necessary in the future to erect a new genus for *P. kanchanaburiense*’. Indeed the form of its G1 is so unique among potamids that its exclusion from *Potamon* and placement into a separate genus, *Stelomon*, is necessary. This is reinforced by the discovery of two other species, one undescribed, sharing the same genus diagnostic characters as *S. kanchanaburiense* (see later).

Externally, members of *Stelomon* gen. nov. resemble a number of Thai *Potamon* species. They can, however, be immediately separated from *Potamon sensu stricto* as well as almost all other Thai potamid genera by the very stout and relatively long G1 terminal segment, which constricts distally and is twisted along the longitudinal axis (versus slender and relatively shorter G1 terminal segment, which usually gently tapers distally and is not longitudinally twisted) (cf. Naiyanetr and Ng, 1990; Ng and Naiyanetr, 1993). *Tomaculammon* Yeo and Ng, 1997 [north-western Thailand] also shows longitudinal torque in the terminal segment of the G1. *Stelomon*, however, can easily be differentiated from *Tomaculammon* by the G2 distal segment being slender and tapering, lacking any distal projection (versus G2 distal segment

cylindrical and stout in appearance with an acute conical distal projection) (cf. Yeo and Ng, 1997).

The G1 form of *Stelomon* also appears superficially similar to that of certain *Malayopotamon* species [Java, Sumatra], e.g. *M. brevimarginatum* (De Man, 1892), but the two genera can still be differentiated by the position of the groove for the G2 on the terminal segment of the G1 (ventral in *Stelomon* versus dorsal or marginal in *Malayopotamon*) (Ng and Naiyanetr, 1993: 8). The G1 of *Stelomon* species also resembles that of *Stoliczia chaseni* (Roux, 1934) [Peninsular Malaysia] but the latter species does not have a flagellum on the third maxilliped exopod, and their carapace features differ considerably (Ng and Naiyanetr, 1993: 8; Ng, 1988b: 64).

*Stelomon* currently consists of three species, namely, *S. kanchanaburiense* (Naiyanetr, 1992), *S. pruinatum* (Alcock, 1909), and *S. tharnlod* sp. nov. *Potamon* (*Potamon*) *turgidulimana* Alcock, 1910, reported by Bott (1970: pl. 39 figure 38, pl. 48 figure 38) [as a species of *Ranguna*] is probably a fourth species of *Stelomon*. The G1 figured by Bott (1970: pl. 39 figure 38) appears to be of the *Stelomon* type; however, we cannot be sure as the photograph is not very clear. Bott (1970) stated that the specimen (collected from 'Upper Tenasserim') was deposited in the Natural History Museum, London, but we have not been able to find it there and therefore cannot confirm its generic placement as yet.

#### *Etymology*

The genus name is derived from the Latin word, *stela*, meaning pillar or column, in arbitrary combination with the genus name *Potamon*, alluding to the proportionately long and stocky G1 terminal segment characteristic of this genus. Gender neuter.

#### *Distribution*

*Stelomon* gen. nov. is so far known only from Tavoy, Myanmar (= Burma) and 'hills between Burma and Siam' (Alcock, 1909, 1910); Kanchanaburi and Phetchaburi provinces in western Thailand.

#### ***Stelomon kanchanaburiense*** (Naiyanetr, 1992)

(figures 1, 2)

*Ranguna kanchanaburiensis*: Naiyanetr, 1978a: 84 (nomen nudum); Naiyanetr, 1978b: 7 (nomen nudum); Naiyanetr, 1978c: 32, figure 3 (nomen nudum); Naiyanetr, 1980: 51 (nomen nudum); Ng, 1988a: 25 (nomen nudum).

*Potamon kanchanaburiensis*: Naiyanetr, 1985: 260 (nomen nudum); Naiyanetr, 1988: 9, pl. 6 figure 5 (nomen nudum); Naiyanetr, 1992a: 2, figures 1A, B; Naiyanetr, 1992b: 49; Naiyanetr, 1998: 111; Ng and Naiyanetr, 1993: 7, figures 1, 34.

#### *Material examined*

HOLOTYPE: male (62.4 × 47.7 mm) (RMNH D 42352), Sai Yok Noi waterfall, Sai Yok District, Kanchanaburi Province, Thailand, coll. P. Naiyanetr, 7 March 1976.

PARATYPES: one female (44.2 × 34.0 mm) (ZRC 1991.1835), same data as holotype. one male, one female (male 55.1 × 41.8 mm) (RMNH D 41616), same locality and collector as holotype, 19 July 1981.

*Others*. Eight males, four females (largest male 59.5 × 44.3 mm) (ZRC 1998.1142), one male, one female (male 52.7 × 37.9 mm) (ZRC 1995.437), 25 males, 35 females (largest male 61.7 × 44.2 mm) (CUMZ), Thong Pha Phum District,



FIG. 1. *Stelomon kanchanaburiense* (Naiyanetr, 1992). Holotype male (62.4 × 47.7 mm) (RMNH D 42352).

Kanchanaburi Province, Thailand, coll. S. Panha and C. Ekavibhathai, 17 November 1991. Two males (larger 42.8 × 33.0 mm) (ZRC 1998.1143), two males (larger 51.9 × 39.3 mm) (CUMZ), Ban Huay Ka Yeng, Thong Pha Phum District, Kanchanaburi Province, Thailand, coll. S. Phitsaksindhorn, October 1997. Four males (largest 45.9 × 35.0 mm) (ZRC 1998.1144), Nam Chon waterfall, Si Sawat District, Kanchanaburi Province, Thailand, coll. P. Naiyanetr, 24 November 1990.

#### Remarks

*Stelomon kanchanaburiense* has been diagnosed and illustrated by Ng and Naiyanetr (1993: 7, figures 1, 34). We have only to add that in males, thoracic sternites 5 and 6 are medially interrupted, while sternites 7 and 8 are separated by distinct longitudinal median suture (figure 2I). Part of the thoracic sternum of a female paratype (RMNH D 41616) (44.7 × 33.1 mm) is illustrated in figure 2J. The nomenclature of this species was clarified by Naiyanetr (1992a).

In the present study, we re-examined part of the type series, including the holotype, as well as a large series of specimens from other parts of Kanchanaburi Province, to document infra-specific variation. Externally, all the specimens are very similar except for noticeable variation in the third maxilliped exopod flagellum length. Ng and Naiyanetr (1993: 7, figure 34A) noted that the left third maxilliped flagellum was distinctly shorter than the merus width. The holotype appears to be unusual in this respect, as other specimens examined had flagella ranging from slightly shorter than to subequal to the width of the merus (e.g. figure 2A). Unfortunately, the flagellum on the right third maxilliped of the holotype is also broken.

The present specimens also show variation in the narrowed distal part of the G1 terminal segment. The left G1 of the holotype has a distinctly outwardly hooked distal part with a relatively sharp tip although its right G1 figured by Ng and

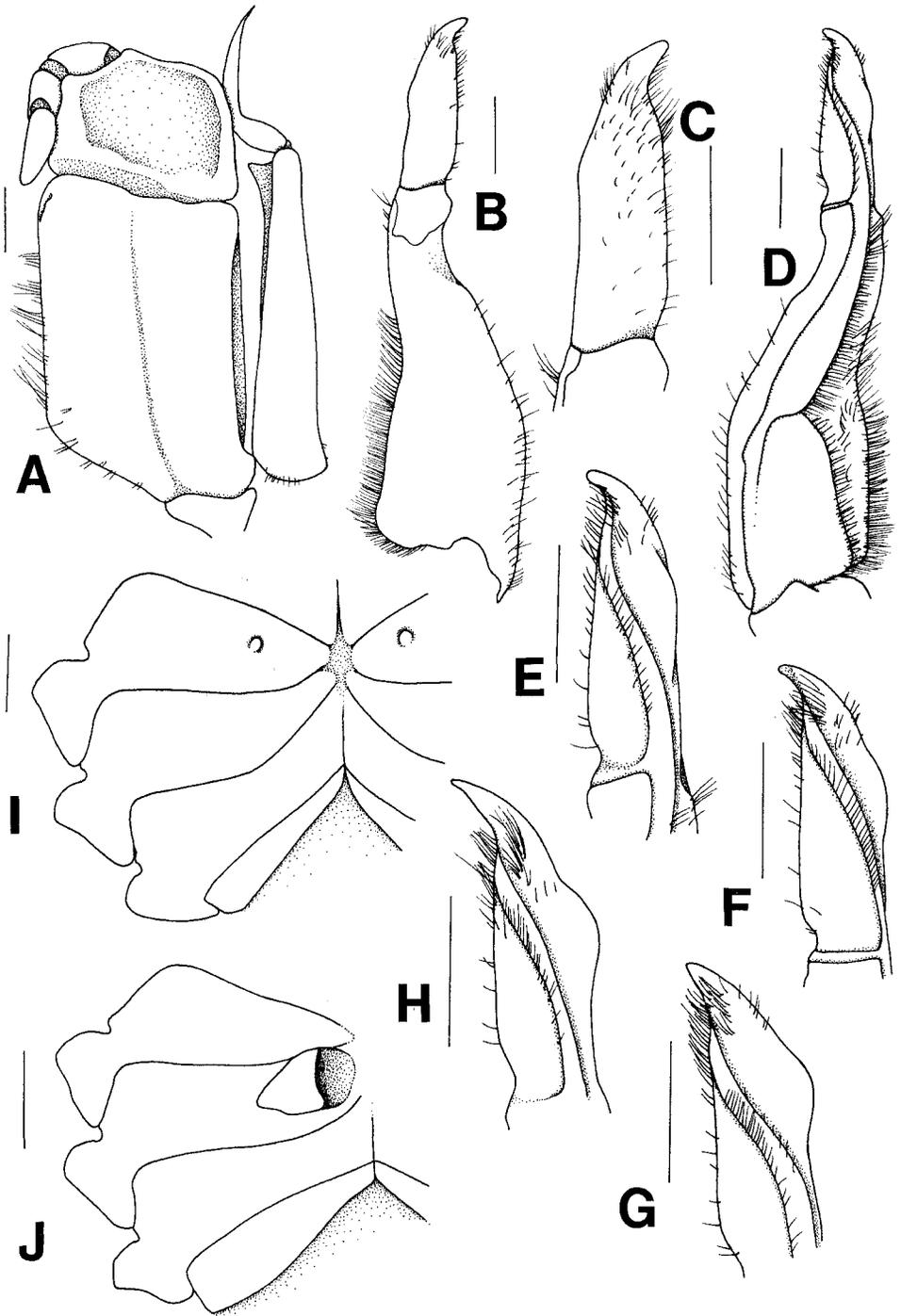


FIG. 2. *Stelomon kanchanaburiense* (Naiyanetr, 1992): (A-F) male (57.6×44.5 mm) (ZRC 1998.1142); (H) male (57.7×42.8 mm) (ZRC 1998.1142); (G) paratype male (55.1×41.8 mm) (RMNH D 41616); (I) holotype male (62.4×47.7 mm) (RMNH D 42352); (J) paratype female (44.7×33.1 mm) (RMNH D 41616). (A) left third maxilliped; (B, D) right G1, (C, E-H) terminal segment of right G1. (B, C) dorsal view; (D, E, G, H) ventral view; (F) ventrolateral view. (I, J) thoracic sternites 5-8. Scales = 2.0 mm in (A-H), 5.0 mm in (I, J).

Naiyanetr (1993: figures 34B–E) is not hooked but slightly bent distally with a rounded tip. This difference is probably due to the distal part of the right G1 being worn down by abrasion possibly during mating. All the other specimens examined, including paratypes, have G1s with the distal parts hooked outwards to varying degrees and tips being sharp or rounded (figures 2B–H). The degree of twist of the terminal segment also varies slightly among individuals but the distal opening remains more or less lateral-facing in position (figures 2E–H). The distinctive hooked structure is present even in the smallest adult male specimen ( $35.2 \times 26.4$  mm) (ZRC 1998.1142) and is, therefore, very diagnostic for *S. kanchanaburiensis*.

***Stelomon pruinoseum* (Alcock, 1909)**

(figures 3–5)

*Potamon pruinoseum* Alcock, 1909: 246; Alcock, 1910: 50, figure 8.

*Ranguna (Ranguna) rangoonensis*: Bott, 1970: 163 (part) (not *Potamon (Potamon) rangoonensis* Rathbun, 1904).

*Material examined*

LECTOTYPE: male ( $27.4 \times 21.2$  mm) (ZSI 5531/10), Hills between Burma and Siam, coll. and date unknown.

PARALECTOTYPE: female ( $31.2 \times 23.4$  mm) (ZSI 5531/10), same data as lectotype.

*Other.* Male ( $40.5 \times 30.4$  mm) (ZRC 1998.1145), Ban Krang, Huai Mae Phraeng, Kaeng Krachan National Park, Phetchaburi Province, Thailand, coll. T. Bundhitwongrut, 28 September 1998.

*Diagnosis*

Third maxilliped exopod with well-developed flagellum, slightly longer than merus width. Male abdomen triangular; telson triangular, with distinctively concave lateral margins, tip rounded. G1 terminal segment relatively long, *c.* 0.6 times length of subterminal segment, stout, *c.* 3.9 times longer than broad, twisted along longitudinal axis, with groove for G2 clearly visible from ventral view, with distinct swelling on median part of inner margin, narrowed distal part straight, gently tapered, tip rounded with more or less ventral distal opening. G2 distal segment *c.* 0.6 times length of basal segment.

*Remarks*

In the original description of this species, Alcock (1909) did not provide any other information about the material examined, except for the locality, which was stated only as 'Hills between Burma and Siam' (Alcock, 1909: 246). Alcock (1910) subsequently listed three lots of specimens in the Indian Museum under this species including one from the above-mentioned location consisting of an immature male and female specimen (ZSI 5531/10). These two specimens, which were examined, are the *de facto* syntypes of the species. The male specimen ( $27.4 \times 21.2$  mm) (ZSI 5531/10) is hereby designated as the lectotype of *Stelomon pruinoseum* (Alcock, 1909). The remaining two lots of specimens mentioned by Alcock (1910), which were collected from 'Tavoy', are not types as they were not mentioned in the original publication and could not be located for examination in the ZSI. Another specimen from Tavoy, a juvenile male (NHM 1909.9.2.1), presented to the Natural History

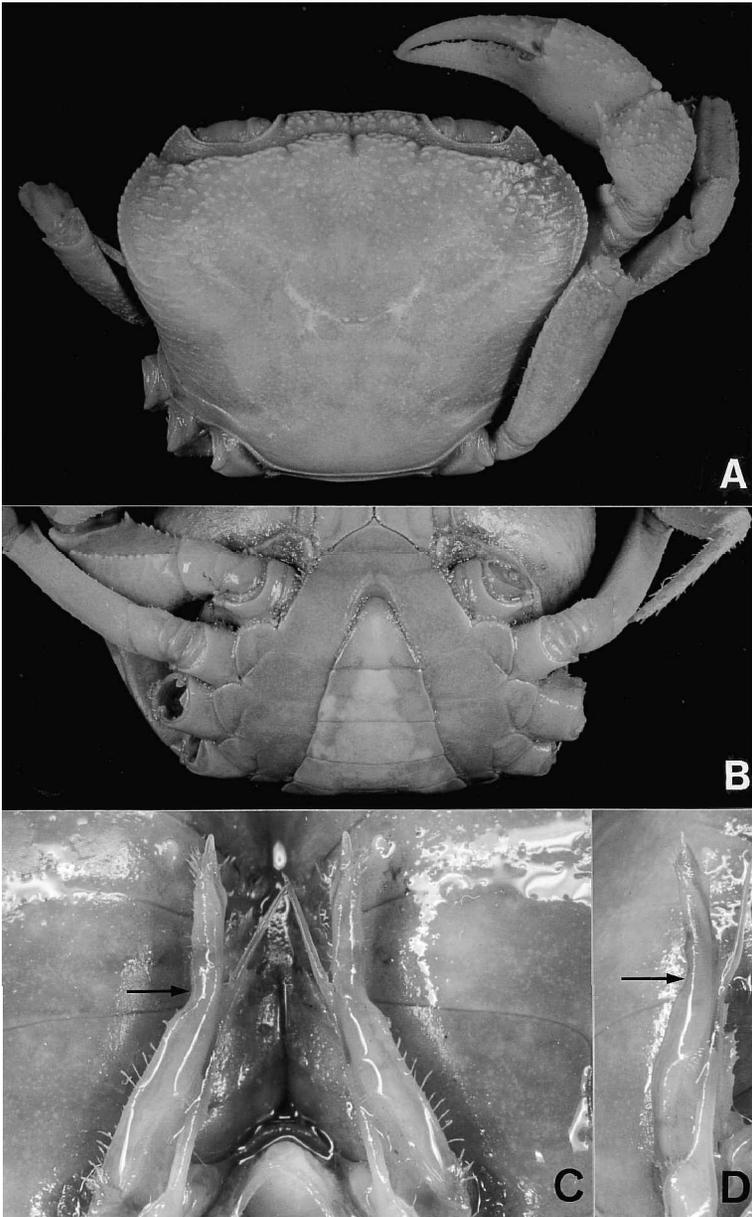


FIG. 3. *Stelomon pruinoseum* (Alcock, 1909), lectotype male (27.4 × 21.2 mm) (ZSI 5531/10): (A) dorsal view of carapace; (B) anterior thoracic sternites and abdomen; (C, D) right G1 (indicated by arrow). (C) *in situ* ventrolateral view; (D) *in situ* ventral view.

Museum, London, by the ZSI, was previously examined by the second author but this proved inconclusive as the G1 was not fully developed (Türkay and Naiyanetr, 1987: 391).

It is a policy of the ZSI not to allow G1s of crab specimens to be detached for examination, therefore, we can only provide a photograph of the lectotype's G1s *in situ* (figures 3C, D), while the present drawings and diagnosis of the G1 of



FIG. 4. *Stelomon pruinosum* (Alcock, 1909), male (40.5 × 30.4 mm) (ZRC 1998.1145).

*S. pruinosum* are based on a non-type adult male specimen instead (figures 5B–E). This specimen (40.5 × 30.4 mm) (ZRC 1998.1145) was recently collected from Kaeng Krachan National Park in Phetchaburi Province, Thailand, and matches the lectotype very well in external morphology and most aspects of the G1 structure. The only difference between the smaller lectotype and the non-type specimen is the G1 being slightly more slender in the former (figures 3C, D, 5B–E). This is likely to be due to size-related variation and does not have any interspecific significance.

Bott (1970) synonymized *Potamon pruinosum* under *Potamon (Potamon) rangoonensis* Rathbun, 1904 (as a *Ranguna*), without explanation and without indicating whether he examined the types of either species. However, the specimen collected from Assam and deposited in the Forschungsinstitut Senckenberg (SMF 2807), which was figured by Bott (1970: pl. 38 figure 35, pl. 47 figure 31), is clearly not *P. (P.) rangoonensis sensu stricto*. Bott's specimen is not even congeneric with *P. (P.) rangoonensis* as its carapace is distinctly less rugose; the external orbital angle is broadly triangular (versus acutely triangular); and the G1 is very different in form (cf. Rathbun, 1904: pl. 11 figure 2; Türkay and Naiyanetr, 1987: 391, figures 1, 2). In any case, Bott's (1970) synonymy was not valid, as *Stelomon pruinosum* can be immediately separated from both Bott's specimen as well as *P. (P.) rangoonensis*, by its more broadly triangular male abdomen (figures 3B, 5H; cf. Bott, 1970: 1970: pl. 47 figure 31; Rathbun, 1904: figure 18) and very different G1 structure (figures 3C, D, 5B–E; cf. Bott, 1970: pl. 38 figure 35; Türkay and Naiyanetr, 1987: 391, figure 2).

Externally, *Stelomon pruinosum* can be separated from *S. kanchanaburiense* and *S. tharnlod* sp. nov. by its relatively broader triangular male abdomen (figures 3B, 5H, 7H; cf. Ng and Naiyanetr, 1993: figure 1C). It is also easily separated from *S. kanchanaburiense* by the distal part of its G1 terminal segment being upright (versus distally hooked terminal segment) and the ventral facing G1 distal opening (versus lateral facing distal opening) (figures 2B–H, 5B–E). A less obvious difference

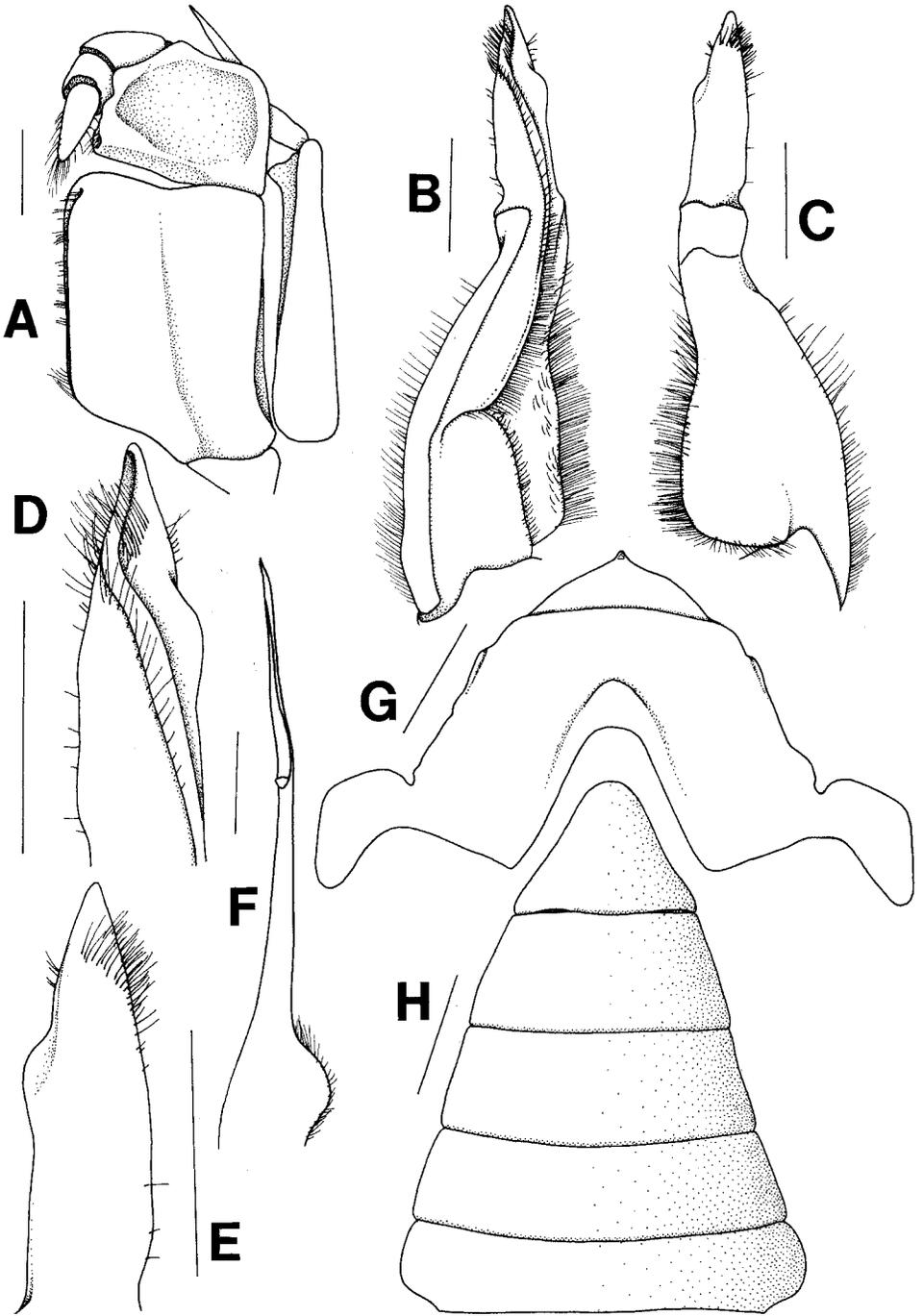


FIG. 5. *Stelomon pruinosum* (Alcock, 1909), male (40.5 × 30.4 mm) (ZRC 1998.1145): (A) left third maxilliped; (B, C) right G1, (D, E) terminal segment of right G1. (B, D) ventral view; (C, E) dorsal view. (F) right G2; (G) anterior thoracic sternum; (H) abdominal segments 3–7. Scales = 2.0 mm in (A–F), 5.0 mm in (G–H).

is seen in the flagellum of the third maxilliped exopod of *S. pruinorum*, which is slightly longer than the merus width, while that of *S. kanchanaburiensis* never exceeds the merus width (figures 2A, 5A). Differences in the G1 form between *S. pruinorum* and *S. tharnlod* are discussed under the *Remarks* for the latter species (see later). The G1 terminal segment (especially the gently tapered distal part) of *S. pruinorum* resembles that figured by Bott (1970: pl. 39 figure 38) for *Potamon (Potamon) turgidulimana* Alcock, 1910, which may prove to be a fourth *Stelomon* species (see *Remarks* under genus). However, there are two other notable differences in the G1 subterminal segment of *S. pruinorum* (when viewed from all possible orientations) and the species figured by Bott (1970), namely: (i) the inner margin lacking a distal hump (versus the inner margin with a distinct distal hump present); and (ii) the outer margin distinctly sloping outwards and being gently convex (versus the outer margin not sloping outwards and being gently concave) (figure 5B; cf. Bott 1970: pl. 39 figure 38).

In the live specimen, the dorsal carapace was very dark purple with whitish margins (frontal and anterolateral), cristae (epibranchial and postorbital) and rugae. The chelipeds were light purple with yellowish finger tips, and were covered with whitish granules and rugae. The ambulatory legs were light purple with slightly yellowish joints and bright yellow dactyli.

***Stelomon tharnlod* sp. nov.**  
(figures 6, 7)

*Material examined*

**HOLOTYPE:** male (38.5 × 29.1 mm) (ZRC 1998.1146), Tritrung waterfall, Tharn Lod, Si Sawat District, Kanchanaburi Province, Thailand, coll. P. Naiyanetr, 8 September 1996.

**PARATYPE:** male (c. 39.5 × 29.9 mm—broken carapace) (ZRC 1998.1147), same data as holotype.



FIG. 6. *Stelomon tharnlod* sp. nov., holotype male (38.5 × 29.1 mm) (ZRC 1998.1146).

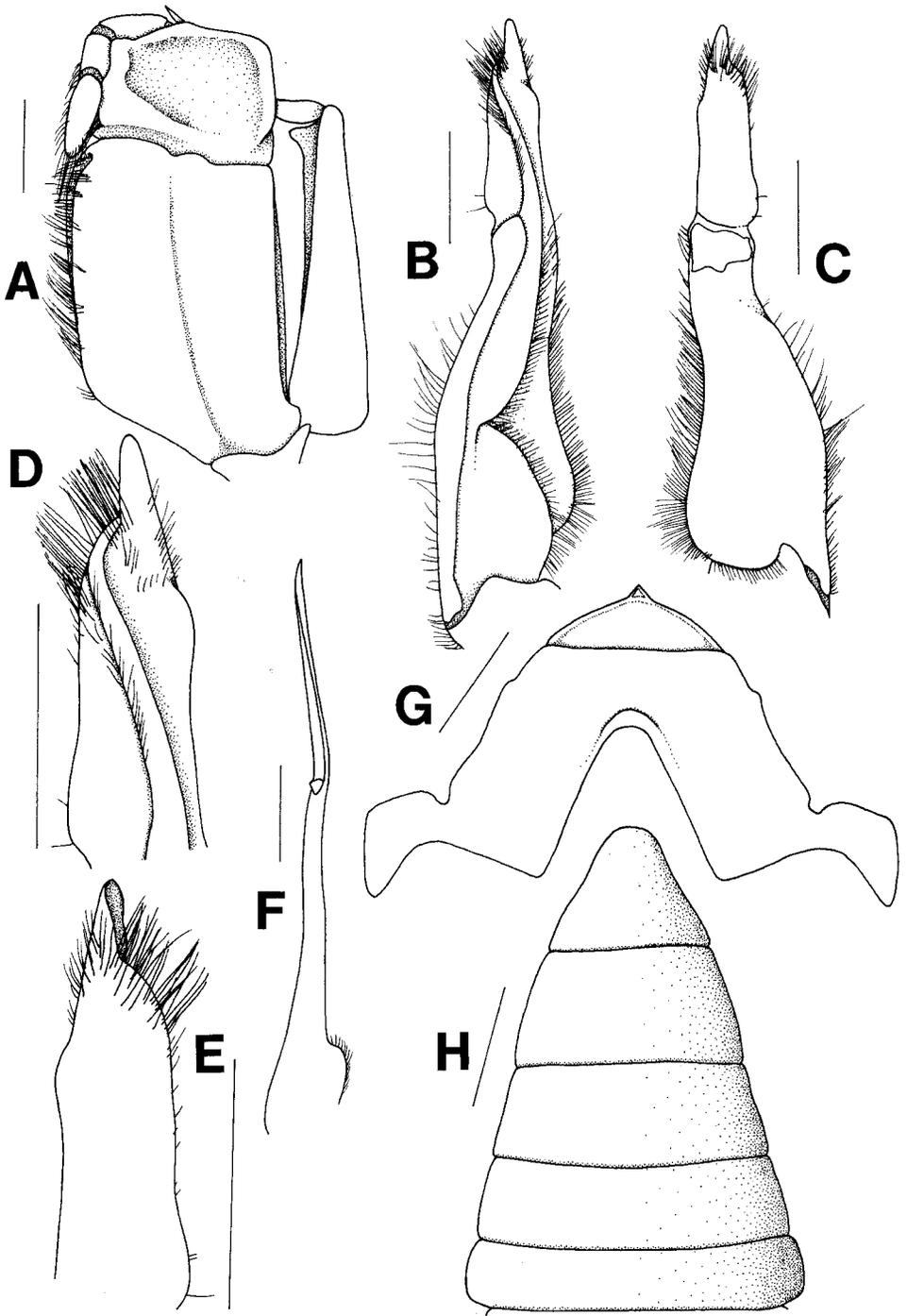


FIG. 7. *Stelomon tharnlod* sp. nov., holotype male (38.5 × 29.1 mm) (ZRC 1998.1146): (A) left third maxilliped; (B, C) right G1, (D, E) terminal segment of right G1. (B, D) ventral view; (C, E) dorsal view. (F) right G2; (G) anterior thoracic sternum; (H) abdominal segments 3–7. Scales = 2.0 mm in (A–F), 5.0 mm in (G–H).

*Diagnosis*

Third maxilliped exopod with well-developed flagellum, slightly longer than merus width. Male abdomen narrowly triangular; telson triangular, with distinctively concave lateral margins, tip rounded. G1 terminal segment relatively long, *c.*0.6 times length of subterminal segment, stout, *c.*3.4 times longer than broad, twisted along longitudinal axis, with groove for G2 clearly visible from ventral view, with distinct swelling on median part of inner margin, narrowed distal part straight, with distinct subdistal notch on outer margin, tip rounded, with more or less dorsal distal opening. G2 distal segment *c.*0.7 times length of basal segment.

*Remarks*

*Stelomon tharnlod* sp. nov. is distinguished from *S. kanchanaburiense* by the distal part of its G1 terminal segment being upright (versus distally hooked) (figures 2B–H, 7B–E). As in *S. pruinorum* (Alcock, 1909), the flagellum of the third maxilliped exopod of *S. tharnlod* also differs slightly from that of *S. kanchanaburiense* in being slightly longer than the merus (versus flagellum not exceeding merus width) (figures 2A, 7A). *Stelomon tharnlod* is similar to *S. pruinorum* in having a straight and upright G1 terminal segment but, as mentioned earlier, can be separated from it by the narrower shape of its male abdomen (see earlier). In addition, *S. tharnlod* can be further differentiated from *S. pruinorum* by the presence of a distinct subdistal notch on its G1 terminal segment outer margin (versus lacking a distinct subdistal notch on the outer margin) as well as its G1 distal opening being dorsal in position (versus ventrally positioned distal opening) (figures 5B–E, 7B–E).

*Etymology*

The species is named after its type locality, Tharn Lod in Kanchanaburi Province, Thailand. The name is used as noun in apposition.

Key to *Stelomon* species

- 1 Flagellum of exopod of third maxilliped not exceeding merus width (figure 2A); distal part of terminal segment of G1 distinctly hooked outwards, with distal opening facing lateral margin (figures 2B–H) . . . . . *S. kanchanaburiense*
- Flagellum of exopod of third maxilliped slightly exceeding merus width (figures 5A, 7A); distal part of terminal segment of G1 straight, not hooked, with distal opening facing dorsal or ventral surface (figures 5B–E, 7B–E) . . . . . 2
- 2 Male abdomen broadly triangular (figure 5H); distal part of terminal segment of G1 lacking a subdistal notch on the outer margin, with distal opening facing ventral surface (figures 5B–E) . . . . . *S. pruinorum*
- Male abdomen narrowly triangular (figure 7H); distal part of terminal segment of G1 with a distinct subdistal notch on the outer margin, with distal opening facing dorsal surface (figures 7B–E) . . . . . *S. tharnlod*

**Acknowledgments**

We are grateful to Charles Fransen (RMNH), Yang Chang Man (ZRC) and Tusharendu Roy (ZSI) for access to comparative material under their care; and to Thanakhom Bundhiwongrut for the specimen of *S. pruinorum*. Thanks also to Peter Ng for his comments and suggestions. This study was partly supported by a research grant to Peter Ng from the National University of Singapore.

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