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Simulium (*Nevermannia*) *chomthongense*, a new species of black fly (Diptera: Simuliidae) from Chiang Mai, Thailand

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Abstract. *Simulium* (*Nevermannia*) *chomthongense* sp. nov. is described from female, male, pupal and larval specimens collected from Doi Inthanon National Park and Doi Phahompok National Park, Chiang Mai, Thailand. This new species, first reported as *S.* (*Eusimulium*) sp. A, and later regarded as *S.* (*N.*) *caudisclerum* Takaoka & Davies, described from peninsular Malaysia, is distinguished from *S.* (*N.*) *caudisclerum* in the male by the number of enlarged upper-eye facets and the relative size of the hind basitarsus against the hind tibia and femur, and in the pupa by the relative length of the stalks of paired filaments against the common basal stalk and the color of the dorsal surface of abdominal segments 1–3 (or 4). Taxonomic and molecular notes are provided to separate this new species from four other known species of the *vernum* species-group, which share an accessory sclerite on the larval abdomen, a rare characteristic in this species-group.

INTRODUCTION

The *Simulium* (*Nevermannia*) *vernum* species-group, which consists of about 130 species, is widely distributed in the Holarctic Region and extends its distribution southward into the Oriental Region where 23 species are recorded (Adler & Crosskey, 2011). In Thailand, this species group is represented by one species, which was first reported as *Simulium* (*Eusimulium*) sp. A, based on a single mature larva collected from a stream at high elevation (1,700 m altitude) in Doi Inthanon National Park (Takaoka & Suzuki, 1984). Later, the larva of this species, under a different subgeneric name, *S.* (*Nevermannia*) sp. A, was noted to agree with that of *Simulium* (*N.*) *caudisclerum* Takaoka & Davies, described from Cameron's Highlands, peninsular Malaysia (Takaoka & Davies, 1995), in most morphological characteristics including the possession of an accessory sclerite just anterior to the posterior circlet of the abdomen, a characteristic rarely occurring in the *vernum* species-group. *Simulium* (*N.*) sp. A was identified tentatively as *S.* (*N.*) *caudisclerum* due to the lack of its adult and pupal specimens (Takaoka & Davies, 1995). The species name, *S.* (*N.*) *caudisclerum*, was first applied to larvae of the *vernum* species-group from Doi Inthanon National Park, when their polytene chromosomes were studied (Kuvangkadilok *et al.*, 1998, 1999). Although this taxonomic decision was followed in the list of black flies from Thailand (Takaoka & Choochote, 2004), and in a study of the molecular phylogeny of Thai black flies (Thanwisai *et al.*, 2006), detailed morphotaxonomic examination of the Thai specimens, in particular, the adult female, male and pupal specimens, remained to be carried out to confirm the species identity.

Recently, we had an opportunity to examine a sufficient number of adults (reared from pupae), pupae and larvae collected from Doi Inthanon National Park and Doi Phahompok National Park, in Chiang Mai, which had been thought to be those of *S.* (*N.*) *caudisclerum*, and to compare them with those of *S.* (*N.*) *caudisclerum* from peninsular Malaysia. As a result, the Thai specimens are shown to have several morphological characteristics differing from those of peninsular Malaysian *S.* (*N.*) *caudisclerum*. In this paper, the species of the *vernum* species-group in Chiang Mai is regarded as a new species and its female, male, pupa and mature larva are described.

The methods of collection, description and illustration, as well as terms for morphological features used here, follow those of Takaoka (2003). The type specimens are deposited at the Entomology Section, Queen Sirikit Botanic Garden, Chiang Mai, Thailand.

***Simulium* (*Nevermannia*) *chomthongense* Takaoka, Srisuka & Choochote sp. nov.**

Simulium (*Eusimulium*) sp. A: Takaoka & Suzuki, 1984: 12–13 (description of larva).
Simulium (*Nevermannia*) sp. A: Takaoka & Davies, 1995: 94.
[*Simulium* (*Nevermannia*) *caudisclerum* (not Takaoka & Davies, 1995): Kuvangkadilok *et al.*, 1998: 215–230; 1999: 197–207; Takaoka & Choochote, 2004: 189].

Description. **Female**. Body length 2.4–2.6 mm. ***Head***. Slightly narrower than width of thorax. Frons brownish-black, grey pruinose, not shiny, densely covered with whitish-yellow scale-like recumbent short hairs interspersed with few dark simple longer hairs along each lateral margin; frontal ratio 1.51–1.73:1.00:1.89–2.07; frons-head ratio 1.00:3.51–5.04. Fronto-ocular area well developed, narrow, directed dorsolaterally. Clypeus dark brown, grey pruinose, moderately covered with whitish-yellow hairs interspersed with few dark longer hairs on each side. Labrum 0.79–0.80 times as long as clypeus. Antenna composed of scape, pedicel and 9 flagellomeres, dark brown to brownish-black except scape, pedicel and base of 1st flagellomere medium brown; 1st flagellomere 1.49–1.70 times as long as 2nd one. Maxillary palp composed of 5 segments, light to medium brown, proportional lengths of 3rd, 4th, and 5th segments 1.00:0.75–0.87:1.48–1.59; 3rd segment (Fig. 1A) swollen; sensory vesicle (Fig. 1A) elongate (0.56–0.59 times as long as 3rd segment), with medium-sized opening. Maxillary lacinia with 12 inner and 12–16 outer teeth. Mandible with 30–33 inner and 13 outer teeth. Cibarium without any denticles. ***Thorax***. Scutum brownish-black except anterolateral calli ochreous, slightly shiny when illuminated at certain angle of light, densely covered with yellow scale-like recumbent hairs interspersed with several dark brown long upright hairs on prescutellar area. Scutellum medium brown, slightly shiny when illuminated at certain angle of light, moderately covered with yellow medium-long to long hairs mixed with several dark brown long upright hairs. Postnotum dark brown, slightly shiny when illuminated at certain angle of light and bare. Pleural membrane bare. Katepisternum dark brown to brownish-black, longer than deep, slightly shiny when illuminated at certain angle of light, and bare. ***Legs***. Foreleg: coxa dark yellow; trochanter light brown except base yellow; femur dark yellow except apical cap medium brown; tibia medium brown, with median large portion on outer surface greyish light brown; tarsus dark brown, with moderate dorsal hair crest; basitarsus moderately dilated, 7.89–9.17 times as long as its greatest width. Midleg: as in foreleg except coxa dark brown on anterolateral surface and brownish-black on posterolateral surface. Hind leg: coxa medium brown; trochanter light brown with base yellow; femur dark yellow with apical cap medium brown; tibia medium to dark brown except extreme base yellow, and medial large portion on outer surface greyish light brown; tarsus dark brown except basitarsus light to medium brown (though base dark brown) and basal 1/2 of 2nd tarsomere greyish; basitarsus (Fig. 1B) narrow, nearly parallel-sided, 7.15 times as long as wide, and 0.75–0.76 and 0.61 times as wide as greatest widths of tibia and femur,

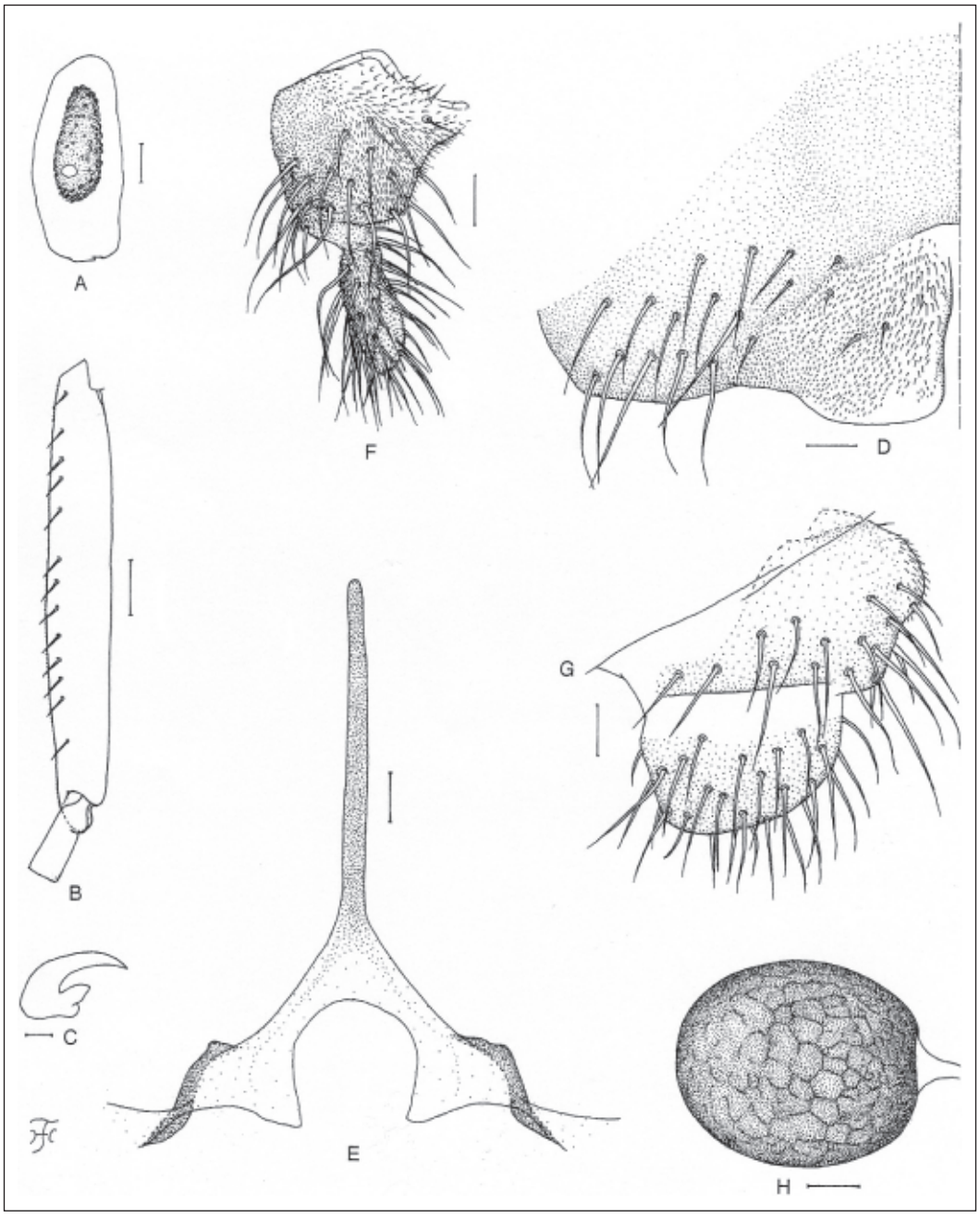

Figure 1. Female of *Simulium* (*Nevermannia*) *chomthongense* sp. nov. A, 3rd segment of left maxillary palp with sensory vesicle (front view); B, basitarsus and 2nd tarsomere of left hind leg showing calcipala and pedisulcus (outer view); C, claw (lateral view); D, sternite 8 and ovipositor valve (only right half shown) (ventral view); E, genital fork (ventral view); F & G, right paraprocts and cerci (F, ventral view; G, lateral view); H, spermatheca. Scale bars. 0.1 mm for B; 0.03 mm for A; 0.02 mm for D–H; 0.01 mm for C.

respectively; calcipala (Fig. 1B) nearly as long as width at base, and 0.50 times as wide as greatest width of basitarsus. Pedisulcus (Fig. 1B) shallow. Claw (Fig. 1C) with large basal tooth 0.44–0.47 times as long as claw.

Wing. Length 2.7–3.0 mm. Costa with dark brown spinules and yellow hairs though intermixed with few brown hairs basally.

Subcosta with light brown hairs except apical 1/5–2/5 bare. Hair tuft on stem vein dark brown. Basal portion of radius fully haired; R_1 with dark spinules and hairs; R_2 with hairs only. Basal cell absent. ***Haltere***. White except basal stem darkened. ***Abdomen***. Basal scale ochreous to light brown, with fringe of whitish-yellow hairs. Dorsal surface of abdomen dark brown to brownish-black except tergite 2 light brown, rest of segment 2 ochreous and tergites 7–9 light brown, moderately covered with dark short to long hairs intermixed with yellow short hairs; tergites of segments 2 and 7–9 wide and shiny when illuminated at certain angle of light, tergites 3–6 relatively narrow and dull. Ventral surface of abdomen mostly pale ochreous; sternal plate on segment 7 developed medially. ***Genitalia***. Sternite 8 (Fig. 1D) bare medially, with 10–14 medium-long to long yellow (except 3–7 longer hairs dark brown) hairs together with few slender short yellow hairs on each side. Ovipositor valves (Fig. 1D) triangular (though medioposterior corners rounded), thin, membranous, moderately covered with microsetae interspersed with 3 or 4 short slender yellow hairs; inner margins slightly concave medially, somewhat sclerotized, and somewhat separated from each other. Genital fork (Fig. 1E) of usual inverted-Y form, with slender stem; arms of moderate width medially; lateral plate of each arm strongly sclerotized along dorsolateral margin, and with thin lobe directed medioposteriorly. Paraproct in ventral view (Fig. 1F) nearly pentagonal, with 5–7 sensilla on unpigmented anteromedial surface; paraproct in lateral view (Fig. 1G) somewhat produced ventrally, 0.69 times as long as wide, with 12–20 medium-long to long hairs on ventral and lateral surfaces. Cercus in lateral view (Fig. 1G) short, rounded posteriorly, 0.48 times as long as wide. Spermatheca (Fig. 1H) ovoidal, 1.16 times as long as its greatest width, well sclerotized except duct and small area near juncture with duct unsclerotized, and with hexagonal patterns (though not well defined) on surface; internal setae absent; both accessory ducts slender, subequal in diameter to major one.

Male. Body length 2.5–3.0 mm. ***Head***. Wider than thorax. Upper eye medium brown, consisting of 15 or 16 vertical columns and 17 or 18 horizontal rows of large facets. Face dark brown, greyish-white pruinose. Clypeus brownish-black, whitish pruinose, moderately covered with golden yellow medium-long hairs (mostly directed upward) interspersed with few light brown longer hairs. Antenna composed of scape, pedicel and 9 flagellomeres, dark brown except base of 1st flagellomere yellow; 1st flagellomere elongate, 2.30 times as long as 2nd one. Maxillary palp light to medium brown, with 5 segments, proportional lengths of 3rd, 4th, and 5th segments 1.00:0.86:1.78; 3rd segment (Fig. 2A) not swollen; sensory vesicle (Fig. 2A) ellipsoidal, small, 0.22–0.25 times as long as 3rd segment, and with small opening. ***Thorax***. As in female except scutum with several golden-yellow long hairs as well as several medium brown ones on prescutellar area. ***Legs***. Color nearly as in female except following characteristics: fore coxa dark yellow to light brown, hind trochanter light brown on posterior surface, and basal 1/4 of hind 2nd tarsomere greyish. Fore basitarsus slightly dilated, 10.00–10.49 times as long as its greatest width. Hind basitarsus (Fig. 2B) enlarged, wedge-shaped, 3.59–3.90 times as long as wide, and 1.09–1.13 and 1.33–1.35 times as wide as greatest width of hind tibia and femur, respectively; calcipala (Fig. 2B) slightly shorter than basal width, and 0.22–0.27 times as wide as greatest width of basitarsus. Pedisulcus (Fig. 2B) well defined at basal 1/4 of 2nd tarsomere. ***Wing***. Length 2.6–3.0 mm; other characteristics as in female except subcosta without hairs. ***Abdomen***. Basal scale medium brown, with fringe of yellow long hairs. Dorsal surface of abdomen dark brown to brownish-black, moderately covered with yellow short hairs intermixed with dark brown short to medium-long hairs; segments 7 and 8 each with pair of slightly shiny lateral patches when illuminated at certain angle of light; ventral surface of segment 2 white, those of segments 3–6 ochreous except sternites medium brown, and those of other segments medium brown. ***Genitalia***. Coxite in ventral view (Fig. 2C)

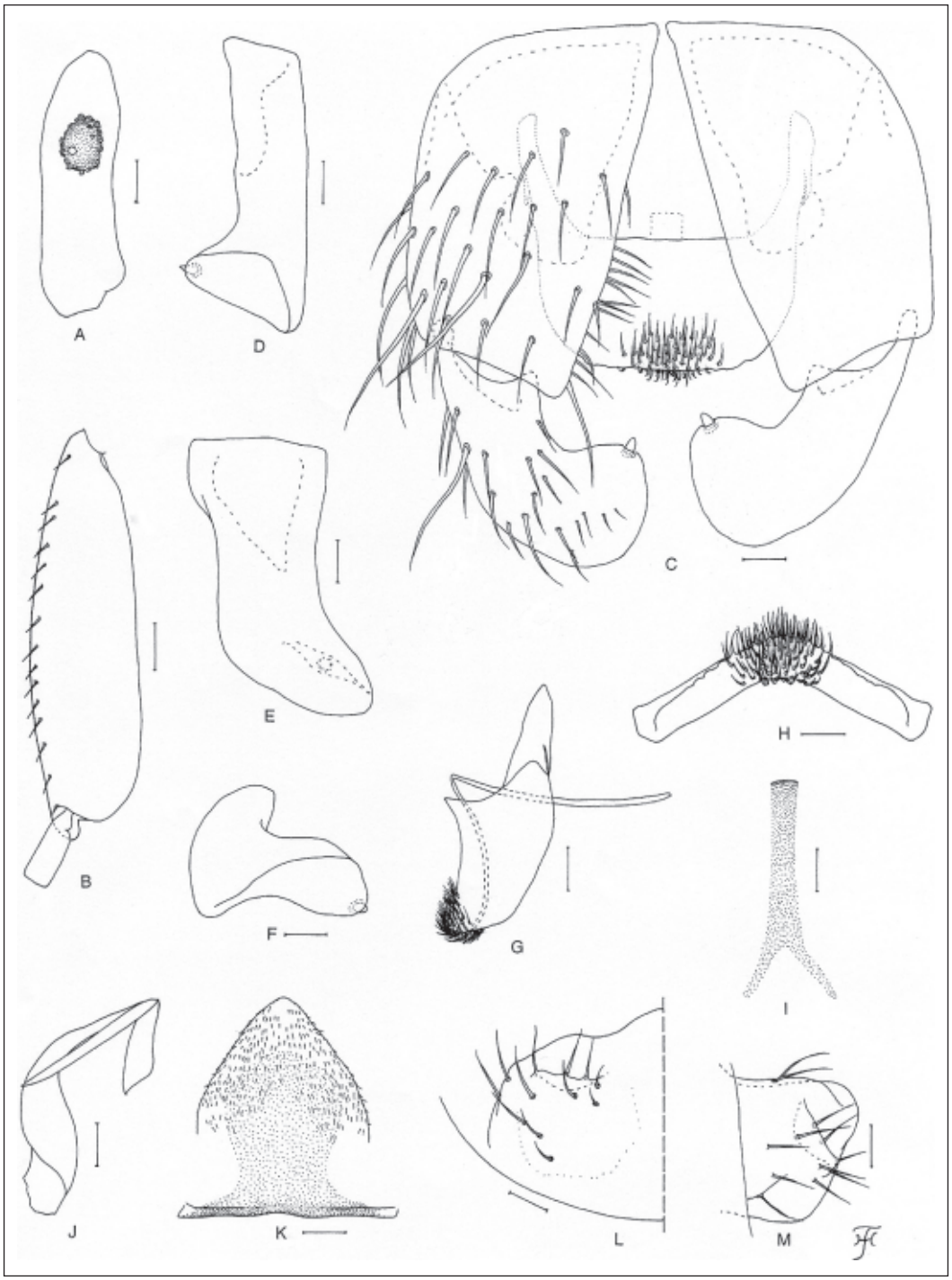

Figure 2. Male of *Simulium* (*Nevermannia*) *chomthongense* sp. nov. A, 3rd segment of right maxillary palp with sensory vesicle (front view); B, basitarsus and 2nd tarsomere of left hind leg showing calcipala and pedisulcus (outer view); C, coxites, styles and ventral plate (ventral view); D–F, right styles (D, lateral view; E, ventrolateral view; F, caudal view); G, ventral plate and median sclerite (lateral view); H, ventral plate (caudal view); I, median sclerite (caudal view); J, right paramere (caudal view); K, aedeagal membrane and dorsal plate (caudal view); L & M, 10th abdominal segments and cerci (right side; L, caudal view; M, lateral view). Scale bars. 0.1 mm for B; 0.02 mm for A & C–M.

nearly rectangular, 1.70 times as long as its greatest width. Style in ventral view (Fig. 2C) bent inward, nearly parallel-sided, rounded apically and with apical spine; style in lateral view (Fig. 2D) shorter than coxite (0.74 times as long as coxite), boot-shaped, with triangular apical lobe directed dorsomedially; style in ventrolateral view (Fig. 2E) straight up to apical 1/3, then curved inwardly, wide basally, nearly parallel-sided up to apical 1/3, and gradually narrowed toward apex; style in caudal view (Fig. 2F) widely depressed on posterior surface of medially directed apical lobe. Ventral plate in ventral view (Fig. 2C) with body transverse, 0.52 times as long as wide, with anterior margin nearly straight, most median portion of posterior margin nearly straight, though ragged, posterolateral corners rounded, darkened along anterior margin, and nearly bare except posteromedian portion of ventral surface densely covered with microsetae; basal arms of moderate length, directed forward, then slightly convergent apically, or somewhat divergent from base as shown in Fig. 2C; ventral plate in lateral view (Fig. 2G) with body gradually narrowed posteriorly; ventral plate in caudal view (Fig. 2H) with body appearing as shallow inverted-V shape, having similar width, posteroventral margin roughly undulate, and densely covered with microsetae medially on posterior surface. Median sclerite (Fig. 2G, I) club-shaped, narrow, with forked apex, and with base located in front of anterior margin of ventral plate. Parameres (Fig. 2J) large, each with small apical appendix directed forwardly, and with 1 distinct long and stout hook. Aedeagal membrane (Fig. 2K) moderately setose, dorsal plate well defined, broadly produced ventrally with round apex, though constricted subbasally. Ventral surface of abdominal segment 10 (Fig. 2L, M) with 2–5 distinct hairs near each posterolateral margin. Cercus (Fig. 2L, M) small, rounded, encircled with 10–13 hairs.

Pupa. Body length 3.0–3.5 mm. ***Head***. Integument light yellowish-brown, bare except lateral surfaces sparsely covered with small tubercles, and frons with few to about 20 round tubercles scattered near each lateral margin in some pupae; antennal sheath without any protuberances; face with pair of simple very long trichomes with coiled apices, and frons with 2 pairs of very long simple trichomes with coiled or uncoiled apices except 3 of 20 pupae examined which have different numbers of trichomes: 1 trichome only on right side though 2 trichomes on left side in 1 pupa; 3 trichomes on right side though 2 trichomes on left side in 1 pupa; 3 trichomes on each side in 1 pupa; among 3 trichomes on each side, additional trichome located dorsally little apart from other 2 trichomes and medium-long, about half as long as 2 other trichome). ***Thorax***. Integument light yellowish-brown, bare except dorsal and dorsolateral surfaces of posterior 2/3 sparsely covered with small round tubercles, with 3 simple very long dorsomedial trichomes with coiled or uncoiled apices, 2 simple anterolateral trichomes (1 very long with coiled apex, 1 long with uncoiled apex), 1 simple medium-long mediolateral trichome with uncoiled apex, and 3 simple ventrolateral trichomes with uncoiled apices (1 medium-long, 2 short), on each side. Gill (Fig. 3A,B) composed of 4 slender thread-like filaments, arranged in pairs, with medium-long common basal stalk having somewhat swollen transparent organ ventrally (often partially broken) at base; common basal stalk 0.76–0.79 times as long as interspiracular trunk; stalks of paired filaments 0.28 –0.96 times as long as common basal stalk; all filaments subequal in length and thickness to one another, though their lengths including their own stalk and common basal stalk varying from 4.2 mm to 5.7 mm by pupae; cuticle of all filaments with well-defined annular ridges and furrows, and densely covered with minute tubercles. ***Abdomen***. Dorsally, segments 1–3 (and often 4) dark greyish and without distinct tubercles; segment 1 with 1 long simple slender hair-like seta on each side; segment 2 with 1 short simple slender hair-like seta and 5 very short somewhat spinous setae submedially on each side; segments 3 and 4 each with 4 hooked spines and 1 very short somewhat spinous seta on each side; segments 5–8 each with spine-combs in transverse row and comb-like groups of minute spines on each side; segment 9 with

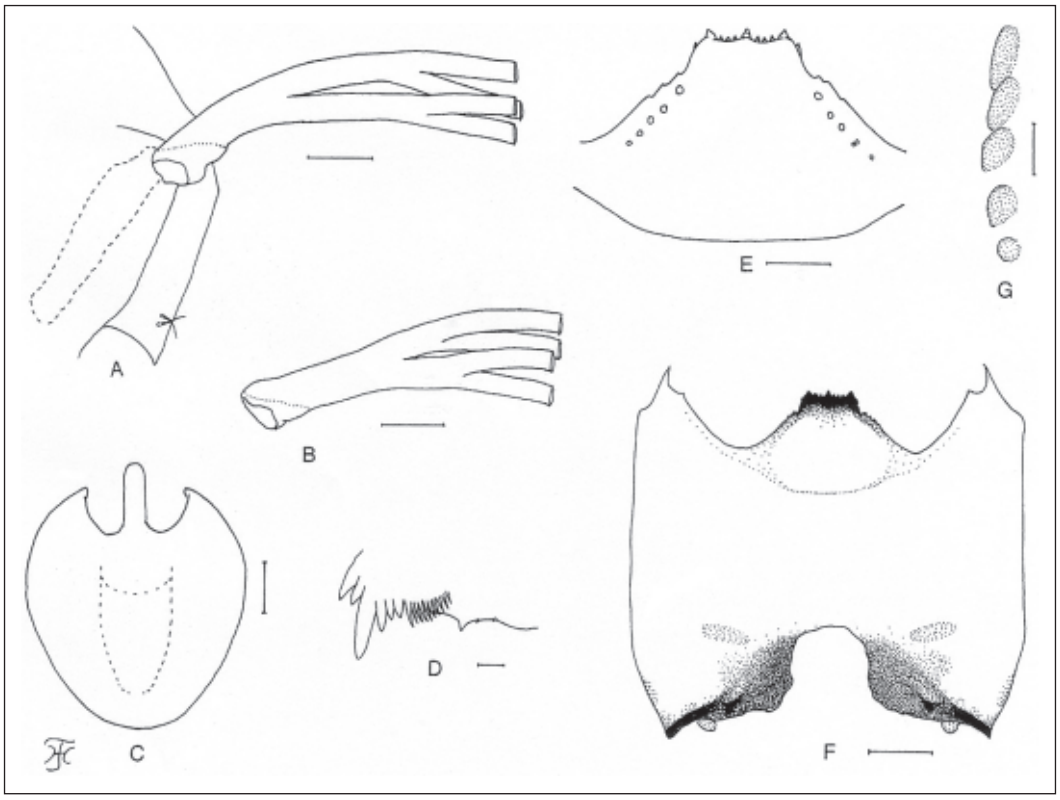

Figure 3. Pupa and larva of *Simulium* (*Nevermannia*) *chomthongense* sp. nov. A–C, pupa and D–G, larva. A, interspiracular trunk and basal portion of gill filaments showing longest stalks of paired filaments (right side; lateral view); B, basal portion of gill filaments showing shortest stalks of paired filaments (right side; lateral view); C, cocoon (dorsal view); D, mandible showing a minute supernumerary serration; E, hypostoma (ventral view); F, head capsule showing postgenal cleft (ventral view); G, accessory sclerite (left side; ventrolateral view). Scale bars. 1.0 mm for C; 0.1 mm for A, B & F; 0.05 mm for E; 0.02 mm for G; 0.01 mm for D.

pair of cone-like terminal hooks and comb-like groups of minute spines. Ventrally, segment 4 with 1 simple hook and few simple slender very short setae on each side; segment 5 with pair of bifid hooks submedially and few very short simple slender setae on each side; segments 6 and 7 each with pair of bifid inner and simple outer hooks somewhat spaced from each other and few very short simple slender setae on each side; segments 4–8 with comb-like groups of minute spines. Each side of segment 9 without grapnel-shaped hooklets. ***Cocoon*** (Fig. 3C). Wall pocket-shaped, moderately woven, widely extended ventrolaterally, appearing round when viewed dorsally; anterior margin thickly woven, with medium to long dorsal projection (up to 1.6 mm long) usually slightly curved downward; posterior 1/2 with floor roughly or moderately woven; individual threads partially visible; 3.6–4.5 mm long by 3.1–4.1 mm wide.

Mature larva. Body length 6.0–7.0 mm. Body creamy. Cephalic apotome whitish-yellow, though narrow area along posterior margin somewhat darkened; head spots moderately positive except anterior spot of posterolateral spots usually obscure. Lateral surface of head capsule whitish-yellow except eye-spot region whitish; eyebrow distinct; 2 relatively large spots and 1 smaller spot in front of posterior margin moderately positive; 2 small round spots below eye-spot region faintly to moderately positive or obscure. Ventral surface of head capsule whitish-yellow to yellow except darkened area near posterior margin on each side of postgenal cleft; horizontal long spot and

round spot on each side of postgenal cleft moderately positive. Antenna composed of 3 segments and apical sensillum, somewhat longer than stem of labral fan; proportional lengths of 1st, 2nd, and 3rd segments 1.00:1.02–1.04:0.67–0.73. Labral fan with 26–34 main rays. Mandible (Fig. 3D) with 3 comb-teeth, of which 1st is longest and 2nd and 3rd are subequal in length; mandibular serration composed of 2 teeth (1 medium-sized and 1very small); major tooth at obtuse angle against mandible on apical side; supernumerary serration usually absent, though rarely present (consisting of 1 very small tooth). Hypostoma (Fig. 3E) with row of 9 apical teeth; median and each corner tooth prominent, subequal in length to one another and much longer than 3 intermediate teeth on each side; lateral margin serrate; 5 or 6 hypostomal bristles per side lying parallel to lateral margin. Postgenal cleft (Fig. 3F) short, rounded apically, 0.65–0.75 times as long as postgenal bridge. Cervical sclerite composed of 2 dark yellow small oblong pieces, not fused to occiput, widely separated medially from each other. Thoracic cuticle bare. Abdominal cuticle almost bare except few posterior segments sparsely covered with colorless simple setae, and last segment densely covered with colorless simple setae on each side of anal sclerite. Rectal scales present. Rectal papilla compound, each of 3 lobes with 11–15 finger-like secondary lobules. Anal sclerite of usual X-form, with anterior arms 0.82–0.90 times as long as posterior ones, broadly sclerotized at base; accessory sclerite (Fig. 3G) composed of 3–6 sclerotized spots on each side. Last abdominal segment with pair of large conical ventral papillae. Posterior circlet with 80–84 rows of up to 15 hooklets per row.

Type specimens. Holotype male with associated pupal exuviae and cocoon (preserved in 80% ethanol), reared from pupa, collected from a stream (width 45 cm, depth 10 cm, stream-bed sandy and muddy, water temperature 10.9ºC, partially shaded, altitude 2,219 m, 18º33'19.4" N, 98º28'43.3" E) moderately flowing in a forest, Chomthong District, Kaew Mae Pan, Doi Inthanon National Park, Chiang Mai, Thailand, 23. I. 2012, by W. Srisuka. Paratypes: 3 females, 3 males, all with associated pupal exuviae and cocoons, and 12 mature larvae (all preserved in 80% ethanol), same data and date as those of the holotype; 3 females, 10 males, all with associated pupal exuviae and cocoons, and 5 mature larvae (all preserved in 80% ethanol), collected from a stream (Summit Stream 3) (width 40 cm, depth 10 cm, stream-bed sandy and muddy, partially shaded, altitude 1,799 m, 20º04'01.5" N, 99º08'36.9" E) moderately flowing in a forest, Fang District, Doi Phahompok National Park, Chiang Mai, Thailand, 22. IX. 2011, by W. Srisuka.

Biological note. The pupae and larvae of this new species were collected from dead tree leaves in the water.

Etymology. The species name *chomthongense* refers to the name of the district, Chomthong, in Doi Inthanon National Park, where this new species was collected.

Remarks. *Simulium* (*Nevermannia*) *chomthongense* sp. nov. is the same species as *S.* (*E.*) sp. reported based on the mature larva collected from Doi Inthanon National Park, Chiang Mai, Thailand (Takaoka & Suzuki, 1984), and later treated as *S.* (*N.*) *caudisclerum* described from Cameron's Highlands, Peninsular Malaysia (Kuvangkadilok *et al.*, 1998, 1999; Takaoka & Choochote, 2004; Thanwisai *et al.*, 2006). The present examination of the Thai specimens, which were so far regarded as *S.* (*N.*) *caudisclerum*, shows that *S.* (*N.*) *chomthongense* sp. nov. is almost indistinguishable in the adult female and larva from *S.* (*N.*) *caudisclerum*, but differs in the adult male and pupa from the latter species by having the following characteristics (characteristics of *S.* (*N.*) *caudisclerum* in parentheses): male upper-eye facets in 15 or 16 vertical columns and 17 or 18 horizontal rows (in 14 vertical columns and 15 horizontal rows), ratios of the hind basitarsus against the hind tibia and femur, 1.09–1.13 and 1.33–1.35 (0.9 and 1.0), body of the ventral plate somewhat narrowed posteriorly when viewed laterally (Fig. 2G) (nearly parallel-sided), lateral surfaces of the head of the pupa sparsely covered with small tubercles (bare), stalks of dorsal and ventral paired pupal gill filaments slightly to greatly

shorter than the common basal stalk (Fig. 3 A, B) (usually much longer, though very rarely shorter), and dorsal surfaces of pupal abdominal segments 1–3 (or 4) dark grey (yellow or transparent).

The result of the present morpho-taxonomic examination appears to be supported by the comparison of the sequences of the mitochondrial 16S rRNA gene (516 base pairs). The sequence of this gene of *S.* (*N.*) *chomthongense* sp. nov. (Accession number in Genbank: AB699899) differs from that of *S.* (*N.*) *caudisclerum* (Accession number in Genbank: AB699900) by seven base pairs, which are greater than the maximum difference of three base pairs usually seen as intraspecific variation (Otsuka *et al.*, Unpublished data). Further, the molecular phylogenetic analysis of the sequences of the mitochondrial 16S rRNA genes of several Oriental species of the *vernum* species-group shows that both species belong to different clusters which are, however, very close to each other: *S.* (*N.*) *chomthongense* sp. nov., together with *Simulium* (*Nevermannia*) *taulingense* Takaoka from Taiwan (Takaoka, 1979), in one cluster, and *S.* (*N.*) *caudisclerum*, together with *Simulium* (*Nevermannia*) *aberrans* Delfinado from the Philippines (Delfinado, 1969; Takaoka, 1983) and *Simulium* (*Nevermannia*) *yushangense* Takaoka from Taiwan (Takaoka, 1979), in another cluster (Otsuka *et al.*, Unpublished data).

Simulium (*N.*) *chomthongense* sp. nov. is placed in the *vernum* species-group within the subgenus *Nevermannia*, mainly by the shape of the male genitalia (Fig. 2C–M). Beside this new species and *S.* (*N.*) *caudisclerum*, the following four species are known to bear an accessory sclerite among species of the *vernum* species-group: *S.* (*N.*) *aberrans* from the Philippines (Takaoka, 1983), *Simulium* (*Nevermannia*) *ludingense* Chen, Zhang & Huang from Sichuan, China (Chen *et al.*, 2005), *S.* (*N.*) *yushangense* from Taiwan (Takaoka, 1979), and *Simulium* (*Nevermannia*) *zhangjiajiense* Chen, Zhang & Bi from Hunan, China (Chen *et al.*, 2004). However, this new species is easily distinguished from these four species by the following characteristics: from *S.* (*N.*) *aberrans* and *S.* (*N.*) *ludingense* by the cocoon with an anterodorsal projection (the cocoon is simple, without such a projection in the latter two species), from *S.* (*N.*) *yushangense* by the pupal gill filaments which are subequal in length and thickness to one another (one of two dorsal paired filaments is always longer and thicker than others in *S.* (*N.*) *yushangense*), and from *S.* (*N.*) *zhangjiajiense* by the greater number (17 or 18) of the horizontal rows of male upper-eye facets (13 horizontal rows in *S.* (*N.*) *zhangjiajiense*) and the ventral plate which is rectangular when viewed ventrally (Fig. 2C) (semicircular in *S.* (*N.*) *zhangjiajiense*).

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