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New records of five species of black flies (Diptera: Simuliidae) from Myanmar, with descriptions of the male and pupa of *Simulium chanyae*

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Abstract. Five species of black flies are newly recorded from Myanmar: *Simulium* (*Gomphostilbia*) *gombakense* Takaoka & Davies, *S.* (*G.*) *siamense* Takaoka & Suzuki, *S.* (*Simulium*) *chanyae* Takaoka & Choochote, *S.* (*S.*) *nigrifacies* Datta and *S.* (*S.*) *tani* Takaoka & Davies (complex). This increases the number of species of black flies from Myanmar from 23 to 28. The male and pupa of *S.* (*S.*) *chanyae* are described for the first time. The pupa of this species is characterized by having the wall-pocket-shaped cocoon without anterolateral windows, separating it from most other species of the *Simulium multistriatum* species-group.

The black fly fauna in Southeast Asia is relatively well studied except in a few countries such as Cambodia, Laos and Myanmar (Adler & Crosskey, 2017). In Myanmar, 23 species are recorded, all of which are classified in five subgenera of the genus *Simulium* Latreille: one in *Asiosimulium* Takaoka & Choochote, seven in *Gomphostilbia* Enderlein, one in *Montisimulium* Rubtsov, two in *Nevermannia* Enderlein and 12 in *Simulium* Latreille (Lewis, 1974; Takaoka, 1989; Takaoka *et al.*, 2017a, b, 2018). Among these species, *S.* (*S.*) *indicum* Becher, 1885 bites humans along the foothills of the Himalayan Mountains (Lewis, 1974), and *S.* (*G.*) *asakoae* Takaoka & Davies, 1995, *S.* (*S.*) *nigrogilvum* Summers, 1911 and *S.* (*S.*) *nodosum* Puri, 1933 are vectors of zoonotic filarial species in Thailand (Fukuda *et al.*, 2003; Ishii *et al.*, 2008; Takaoka *et al.*, 2003).

We surveyed larvae and pupae of black flies in Lashio and Taunggyi, Shan State, central Myanmar, in 2004. A total of 11 species were collected, including five newly recorded species from Myanmar. This survey increases the number of species of black flies recorded from Myanmar from 23 to 28. The male and pupa of *S.* (*S.*) *chanyae* Takaoka & Choochote, 2007 are described for the first time.

The methods of collection, description and illustration, and terms for morphological features follow those of Takaoka (2003) and partially those of Adler *et al.* (2004). All pupae and larvae were collected by us.

Simulium (*Gomphostilbia*) *gombakense* Takaoka & Davies, 1995

Simulium (*Morops*) *gombakense* Takaoka & Davies, 1995: 82–84 (Larva).
Simulium (*Gomphostilbia*) *gombakense*: Takaoka, 2000: 111–114 (Male and pupa): Takaoka *et al.*, 2010: 111–114 (Female).

Specimens examined. One female (with its pupal exuviae and cocoon) in 80% ethanol, reared from a pupa collected from a small irrigation ditch (width 15–20 cm, depth 3–4

cm, bottom muddy, water temperature 23.2ºC, shaded, elevation 593 m) slowly flowing, Namp-San Waterfall, Nan-Saw Village, Lashio, Shan State, central Myanmar, 9-XI-2004; one male (with its pupal exuviae and cocoon) in 80% ethanol, reared from a pupa, and one mature larva collected from a small stream (width 30–50 cm, depth 2–5 cm, bottom muddy, water temperature 23.0ºC, shaded, elevation 623 m) slowly flowing, Namp-San Waterfall, Nar-Sam Village, Lashio, Shan State, central Myanmar, 9-XI-2004.

Distribution. Myanmar (**New record**), Peninsular Malaysia and Thailand.

Ecological notes. The pupae of this species were collected from grasses trailing in the water. Associated species are *S.* (*S.*) *nigrifacies* Datta, 1974 and *S.* (*S.*) *chanyae*.

Remarks. This species was described from Peninsular Malaysia by Takaoka & Davies (1995), and later recorded from Thailand by Takaoka *et al.* (2000). In the subgenus *Gomphostilbia*, this species is placed in the *S. gombakense* species-group, defined by Takaoka (2012).

The female, male and pupa of this species from Myanmar agree morphologically with the original descriptions of this species (Takaoka & Davies, 1995; Takaoka, 2000; Takaoka *et al.*, 2010) including the number of male upper-eye large facets in 15 vertical columns and 15 horizontal rows and specific configuration of the pupal gill.

Simulium (*Gomphostilbia*) *siamense* Takaoka & Suzuki, 1984

Simulium (*Gomphostilbia*) *siamense* Takaoka & Suzuki, 1984: 14–18 (Female, male, pupa and larva).

Specimens examined. One female and one male (with their pupal exuviae and cocoons) in 80% ethanol, both reared from pupae collected from a stream (width 2–3 m, depth 0.2–0.3 m, bottom pebbles, water temperature 21.3ºC, exposed to the sun, elevation 726 m) slowly flowing, Hong-Late Village, Lashio, Shan State, central Myanmar, 8-XI-2004.

Distribution. Myanmar (**New record**), Thailand and Vietnam.

Ecological notes. The pupae of this species were collected from tree leaves in the water. Associated species are *S.* (*G.*) *asakoae* and *S.* (*S.*) *chiangmaiense* Takaoka & Suzuki, 1984.

Remarks. This species was described from Thailand by Takaoka & Suzuki (1984), and later recorded from Vietnam by Crosskey & Howard (1997). This is assigned to the *S. duolongum* subgroup of the *S. batoense* species-group (Takaoka, 2012).

The male of this species is characterized by the scutal colour pattern consisting of a medial vitta and a pair of sublateral round spots, which are not pruinose, though other areas are grey pruinose when illuminated dorsally and viewed anterodorsally (Takaoka & Suzuki, 1984). The male from Myanmar has a similar scutal colour pattern, though a medial vitta is extremely narrow.

Simulium (*Simulium*) *chanyae* Takaoka & Choochote, 2007

Simulium (*Simulium*) *chanyae* Takaoka & Choochote, 2007: 19–22 (Female).

Simulium (*S.*) *chanyae* was originally described from two females caught on a human in Thailand (Takaoka & Choochote, 2007), and assigned to the *S. multistriatum* species-group in the subgenus *Simulium*, redefined by Takaoka & Davies (1996), based on the scutum with five longitudinal vittae, ovipositor valves thin and unpigmented along inner margins (Fig. 1E).

The female is redescribed and the male and pupa are described for the first time.

Female. Body length 2.0–2.2 mm. ***Head***. Narrower than thorax. Frons dark brown to brownish black, shiny, with several dark, long, stout hairs along each lateral margin; frontal ratio 1.27–1.30:1.00:1.68–1.71; frons:head ratio 1.0:4.5–4.8. Fronto-ocular area (Fig. 1A) well developed, short, directed laterally and slightly upward. Clypeus dark brown to brownish black, white pruinose, slightly shiny when illuminated at certain angles, moderately covered with dark-brown long stout hairs except mediolongitudinal area of upper half somewhat widely bare. Labrum 0.67–0.72 times as long as clypeus. Antenna composed of scape, pedicel and nine flagellomeres, medium to dark brown except scape, pedicel, and basal half of first flagellomere yellow, or yellow except

several apical flagellomeres medium brown. Maxillary palp with five segments, proportional lengths of third, fourth, and fifth segments 1.0:1.2–1.3:2.4–2.5; third segment (Fig. 1B) of normal size; sensory vesicle (Fig. 1B) of moderate size (0.40–0.45 times length of third segment) having opening of moderate size near apex. Maxillary lacinia with 12 or 13 inner and 11–13 outer teeth. Mandible with 23–25 inner and 10 or 11 outer teeth. Cibarium (Fig. 1C) with blunt medial projection on posterior margin and without minute processes near base of medial projection. ***Thorax***. Scutum dark brown to brownish black, shiny when illuminated at certain angles, densely covered with whitish-yellow recumbent short hairs interspersed with several dark-brown long upright hairs on prescutellar area; when illuminated in front and viewed dorsally, scutum white pruinose with five longitudinal non-pruinose vittae (one narrow medial vitta, two wider submedial vittae and two wider sublateral vittae though sublateral vittae somewhat wider than submedial ones), all vittae united with broad transverse band on prescutellar area; when illuminated from behind, scutum having reversed colour pattern. Scutellum dark brown, covered with dark brown upright long hairs and whitish yellow short hairs. Postnotum brownish black, white pruinose when illuminated at certain angles and bare. Pleural membrane bare. Katepisternum longer than deep, dark brown, shiny and white pruinose when illuminated at certain angles and bare. ***Legs***. Foreleg: coxa and trochanter yellowish white; femur dark yellow; tibia white except apical cap dark brown, with shiny sheen widely on outer surface when illuminated at certain angles; tarsus brownish black, with moderate dorsal hair crest; basitarsus greatly dilated,4.3–5.0 times as long as its greatest width. Midleg: coxa brownish black; trochanter yellow with base yellowish white; femur dark yellow with apical cap light brown; tibia white to yellowish white except apical cap light to medium brown, and with shiny sheen on posterior surface when illuminated at certain angles; tarsus medium to dark brown except basal two-thirds yellowish white. Hind leg: coxa dark brown; trochanter yellow; femur dark yellow to light brown with basal one-fifth yellow and apical cap medium brown; tibia white to whitish yellow except apical one-third dark brown, and with shiny sheen on posterior surface when illuminated at certain angles; tarsus dark brown except basal two-thirds or little less of basitarsus and basal half of second tarsomere yellowish white; basitarsus (Fig. 1D) nearly parallel-sided, 5.5–5.7 times as long as wide, and 0.7–0.8 and 0.6–0.7 times as wide as greatest widths of hind tibia and femur, respectively; calcipala (Fig. 1D) moderately developed, slightly shorter than basal width, and 0.4 times as wide as basitarsus; pedisulcus (Fig. 1D) well developed; all tarsal claws simple. ***Wing***. Length 2.0–2.2 mm. Costa with dark spinules and hairs; subcosta haired except near apex bare; basal section of radius bare; R_1 with dark spinules and hairs; R_2 with hairs; hair tuft on base of radius dark brown; basal cell absent. ***Halter***. White with basal portion darkened. ***Abdomen***. Basal scale medium brown, with fringe of pale long hairs. Dorsal surface of abdomen medium to brownish black except basal half to two-thirds of segment 2 yellowish white, with short dark hairs; tergite 2 shiny, white iridescent when illuminated at certain angles, and tergites 6–8 shiny; ventral surface of segment 2 whitish and those of other segments light brown; segment 7 with median large sternal plate. ***Terminalia.*** Sternite 8 (Fig. 1E) bare medially, with 22–29 dark medium-long to long stout hairs on each lateral surface. Ovipositor valve (Fig. 1E) rounded posteromedially, membranous, moderately covered with microsetae and one to three short to medium-long hairs, except portions along inner and posteromedial margin widely bare; inner margin so thin and transparent that it may be overlooked. Genital fork (Fig. 1F) of inverted-Y form, with narrow well-sclerotized stem; arms of moderate width, each with distinct short projection (much wider in some females) directed anterodorsally. Paraproct in ventral view (Fig. 1H) nearly quadrate, densely covered with minute setae and with 20–24 short to medium-long hairs on lateral and ventral surfaces except anterolateral corner widely bare; anteromedial surface with five or six short sensilla; paraproct in

lateral view (Fig. 1I) moderately protruded ventrally beyond ventral margin of cercus, 0.8 times as long as wide. Cercus in lateral view (Fig. 1I) short, rounded posteriorly, 0.4–0.5 times as long as wide, and with numerous short to medium-long hairs. Spermatheca (Fig. 1J) large, nearly ovoid, 1.1–1.3 times as long as wide, well sclerotized except portion of juncture with duct unsclerotized, with weakly defined reticulate surface patterns, and with internal setae; accessory ducts subequal in thickness to each other, and to major duct.

Male. Body length 2.4–2.6 mm. ***Head***. Slightly wider than thorax. Upper eye medium brown, with large facets in 17 or 18 vertical

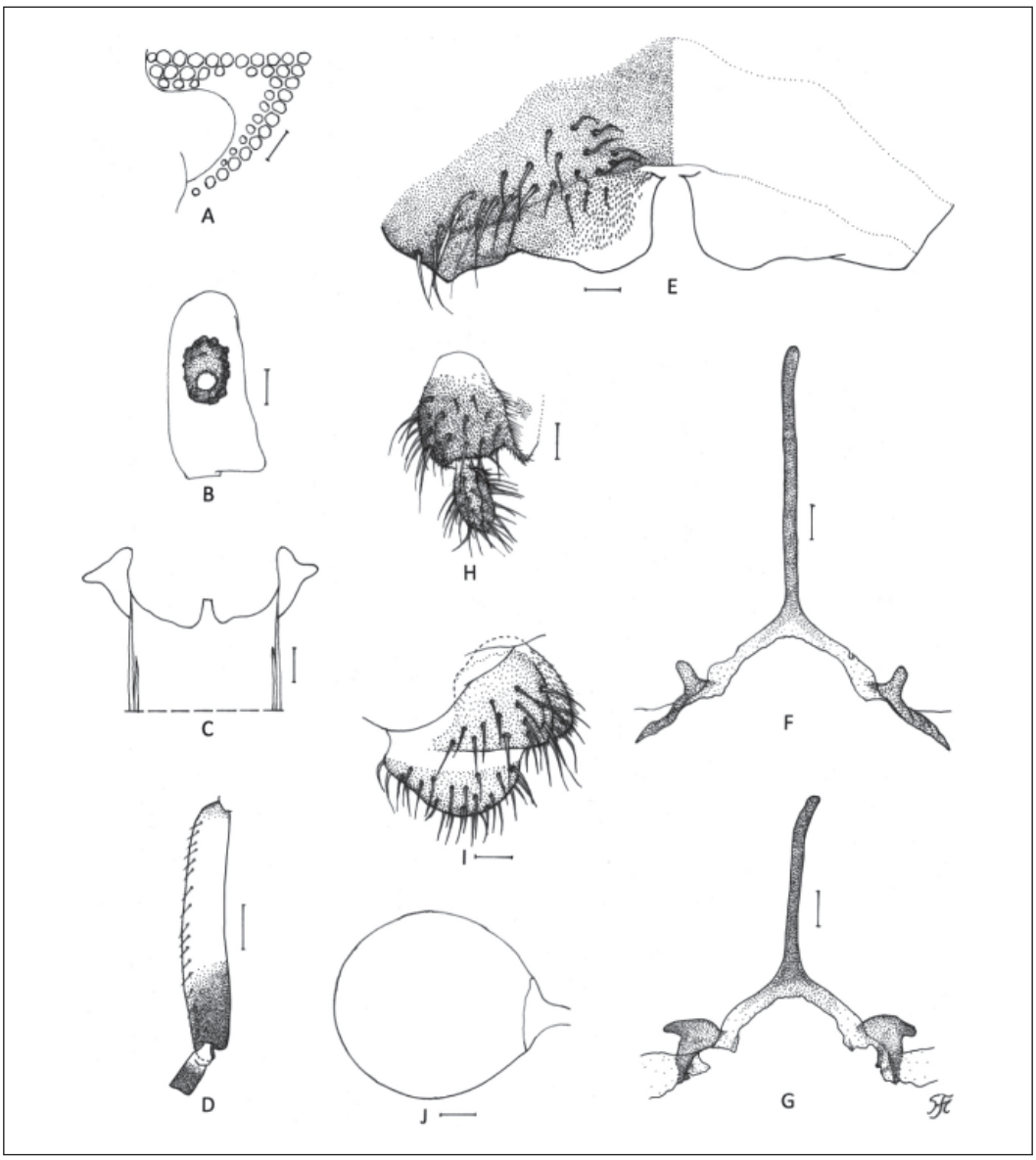

Figure 1. Female of *Simulium* (*Simulium*) *chanyae*. A, Fronto-ocular area (left side, front view). B, Third segment of maxillary palp with sensory vesicle (right side; front view). C, Cibarium (front view). D, Hind basitarsus and second tarsomere (left side; outer view). E, Sternite 8 and ovipositor valves (ventral view). F & G, Genital forks (ventral view; F, normal; G, abnormal). H & I, Paraprocts and cerci (H, ventral view; I, lateral view). J, Spermatheca. Scale bars. 0.1 mm for D; 0.02 mm for A–C and E–J.

columns and 18 or 19 horizontal rows. Clypeus brownish black, white pruinose, sparsely or moderately covered with dark brown hairs. Antenna composed of scape, pedicel and nine flagellomeres, dark brown except scape and pedicel dark yellow to light brown, and base of first flagellomere yellow; first flagellomere elongate, 1.93 times as long as second one. Maxillary palp greyish to dark brown, composed of five segments with proportional lengths of third, fourth, and fifth segments 1.0:1.3:2.6; third segment (Fig. 2A) of moderate size, with apex somewhat produced inward; sensory vesicle (Fig. 2A) of moderate size (0.21 times length of third segment), ellipsoidal, and with opening of moderate size. ***Thorax***. Scutum brownish black, with white pruinose pattern, i.e., anterior pair of rectangular spots on shoulders extended posteriorly along lateral margins and connected to large transverse spot entirely covering prescutellar area; these pruinose areas shiny and iridescent when illuminated at certain angles; scutum uniformly and densely covered with golden yellow recumbent short hairs interspersed with dark brown long upright hairs on prescutellar area. Scutellum dark brown, with several dark long upright hairs and golden yellow short hairs. Postnotum brownish black, white pruinose when illuminated at certain angles and bare. Pleural membrane bare. Katepisternum longer than deep, brownish black, shiny and white pruinose when illuminated at certain angles, and bare. ***Legs***. Foreleg: coxa yellow; trochanter light brown; femur light brown with apical cap medium brown; tibia medium brown except outer surface widely white except basal tip and apical cap, and with white sheen when illuminated at certain angles; tarsus brownish black, with moderate dorsal hair crest; basitarsus moderately dilated, 6.4–6.9 times as long as its greatest width. Midleg: coxa dark brown; trochanter medium brown though base yellow; femur light brown except apical cap medium brown; tibia whitish yellow to yellow except apical cap medium brown, and with white sheen widely on posterior surface; tarsus dark brown to brownish black except basal half of basitarsus yellowish. Hind leg: coxa dark brown; trochanter yellow; femur medium brown except basal one-fifth yellow and apical cap brownish black; tibia dark brown to brownish black except basal tip yellow; tarsus (Fig. 2B) medium to dark brown except basal one-third of basitarsus whitish yellow (though base somewhat darkened) and basal one-third of second tarsomere dark yellow; basitarsus (Fig. 2B) much enlarged, spindle-shaped, gradually widened from base to middle, then tapered from apical one-third to apex, 3.8–3.9 times as long as its greatest width, and 0.9–1.0 and 0.9–1.1 times as wide as greatest widths of hind tibia and femur, respectively; calcipala (Fig. 2B) small, 0.9 times as long as width at base, 0.5 times as wide as greatest width of basitarsus; pedisulcus (Fig. 2B) well developed. ***Wing***. Length 2.0–2.1 mm. Other characters as in female except subcosta haired though apical one-third bare. ***Halter***. White with basal portion darkened. ***Abdomen***. Basal scale dark brown to brownish black, with fringe of dark long hairs. Dorsal surface of abdomen medium brown to brownish black, and covered with dark short hairs; segments 2 and 5–7 each with pair of silvery or bluish iridescent spots dorsolaterally, those on segment 2 broadly connected in middle to each other. ***Genitalia***. Coxites, styles and ventral plate in ventral view as in Fig. 2C. Coxite in ventrolateral view (Fig. 2D) nearly quadrate, 0.8 times as long as width. Style in ventrolateral view (Fig. 2D) elongate, 1.9 times as long as coxite, 2.8 times as long as its greatest width at basal one-third, nearly parallel-sided from base to basal one-third, abruptly tapered to middle, then nearly parallel-sided toward apex; style in outer view (Fig. 2E) spatulate dorsoventrally, with long horn-like basal protuberance having stout spines on anterior margin; Ventral plate in ventral view (Fig. 2C) with body longer than wide, posterior margin and lateral margins rounded, covered with many minute setae on anterior and anterolateral surfaces of central portion, and several ridges on posterior surface; arms directed forward and divergent from each other; ventral plate in lateral view (Fig. 2F) with posterior margin rounded and serrated, having ventromedial process with bare round apex, and moderately covered with

microsetae on anterolateral surface near base of ventromedial process; ventral plate in caudal view (Fig. 2G) with its body nearly triangular, with several ridges on posterior surface, having ventromedial process widened from base to middle, then tapered toward round apex. Median sclerite (Fig. 2F, H) arising near anterior margin of ventral plate and directed dorsally, plate-like, widened from base toward apex, with round apex, brown basally, but not so well sclerotized apically. Paramere (Fig. 2I) with several distinct hooks. Aedeagal membrane (Fig. 2J) moderately covered with minute setae, and with weakly sclerotized dorsal plate in form of horizontal bar (Fig. 2J). Abdominal segment 10 (Fig. 2K, L) without distinct hair on ventral and lateral surfaces. Cercus (Fig. 2K, L) small, rounded, with 7–13 distinct hairs.

Pupa. Body length 2.5–3.0 mm. ***Head***. Integument ochreous, densely and elaborately covered with small round tubercles; antennal sheath bare except basal portion covered with small tubercles; frons with two unbranched slender short trichomes (Fig. 3A) on each side; face with unbranched slender short trichome (Fig. 3B) on each side. ***Thorax***. Integument dark yellow to ochreous, densely and elaborately covered with small round tubercles; thorax with three medium-long anterodorsal trichomes (all unbranched, or two unbranched and one bifid) (Fig. 3C), two anterolateral trichomes (anterior trichome unbranched, medium-long, and posterior trichome unbranched or bifid, medium-long) (Fig. 3D), one unbranched medium-long mediolateral trichome (Fig. 3E), and three unbranched ventrolateral trichomes (one short, slender, and two others medium-long) (Fig. 3F), on each side. Gill (Fig. 3G) with eight slender thread-like short filaments in four pairs (though two middle pairs sharing short stalk) arising from short common basal stalk; all pairs short-stalked; gill filaments divergent basally, upper filament of dorsal pair forming an angle of 180 degrees against lower filament of ventral pair when viewed laterally; filaments slightly shortened from dorsal to ventral, with upper filament of dorsal pair longest (1.6 mm long), and lower filament of ventral pair shortest (1.2 mm long); eight filaments thinner from dorsal to ventral, with dorsal paired filaments thickest, nearly twice as thick as ventral paired filaments which are thinnest, when basal portions were compared; all filaments light to medium brown, tapered toward apex, with distinct annular ridges and furrows forming definite reticulate surface patterns, and densely covered with minute tubercles. ***Abdomen***. Dorsally, segment 1 light brown and bare or sparsely covered with minute tubercles, and other segments unpigmented except basal portions of spine-combs on segment 8 yellow; segment 1 with one unbranched slender short seta on each side; segment 2 with one unbranched slender short seta and five unbranched short setae on each side; segments 3 and 4 each with four distinct hooked spines and one unbranched short seta on each side; segment 8 with distinct spine-combs in transverse row on each side; segments 5, 6, 7 and 9 lacking spine-combs; segments 6–9 each with comb-like groups of minute spines on each side; segment 9 without terminal hooks. Ventrally, segments 3–9 unpigmented, each (except segment 9) with comb-like groups of minute spines; segment 4 with few unbranched slender minute setae on each side; segment 5 with pair of bifid stout hooks submedially and few unbranched short setae on each side; segments 6 and 7 each with pair of bifid inner and unbranched or bifid outer stout hooks somewhat separated from each other, and few unbranched short setae on each side. Grapnel-shaped hooklets absent on each side of segment 9. ***Cocoon*** (Fig. 3H, I). Wall-pocket-shaped, tightly and thickly woven, ochreous, without anterolateral window on each side, and not extended ventrolaterally; individual threads invisible; 3.0–3.5 mm long by 1.2–1.4 mm wide.

Specimens examined: Five females and three males (with their associated pupal exuviae and cocoons) in 80% ethanol, all reared from pupae collected from a stream (width 6–8 m, depth 0.5 m, bottom rocky and muddy, water temperature 17.0°C, partially shaded, elevation 1,371 m) moderately flowing, Nyo-Me Village, Taunggyi Town, Shan State, central Myanmar, 13-XI-2004; eight females and five males (with their

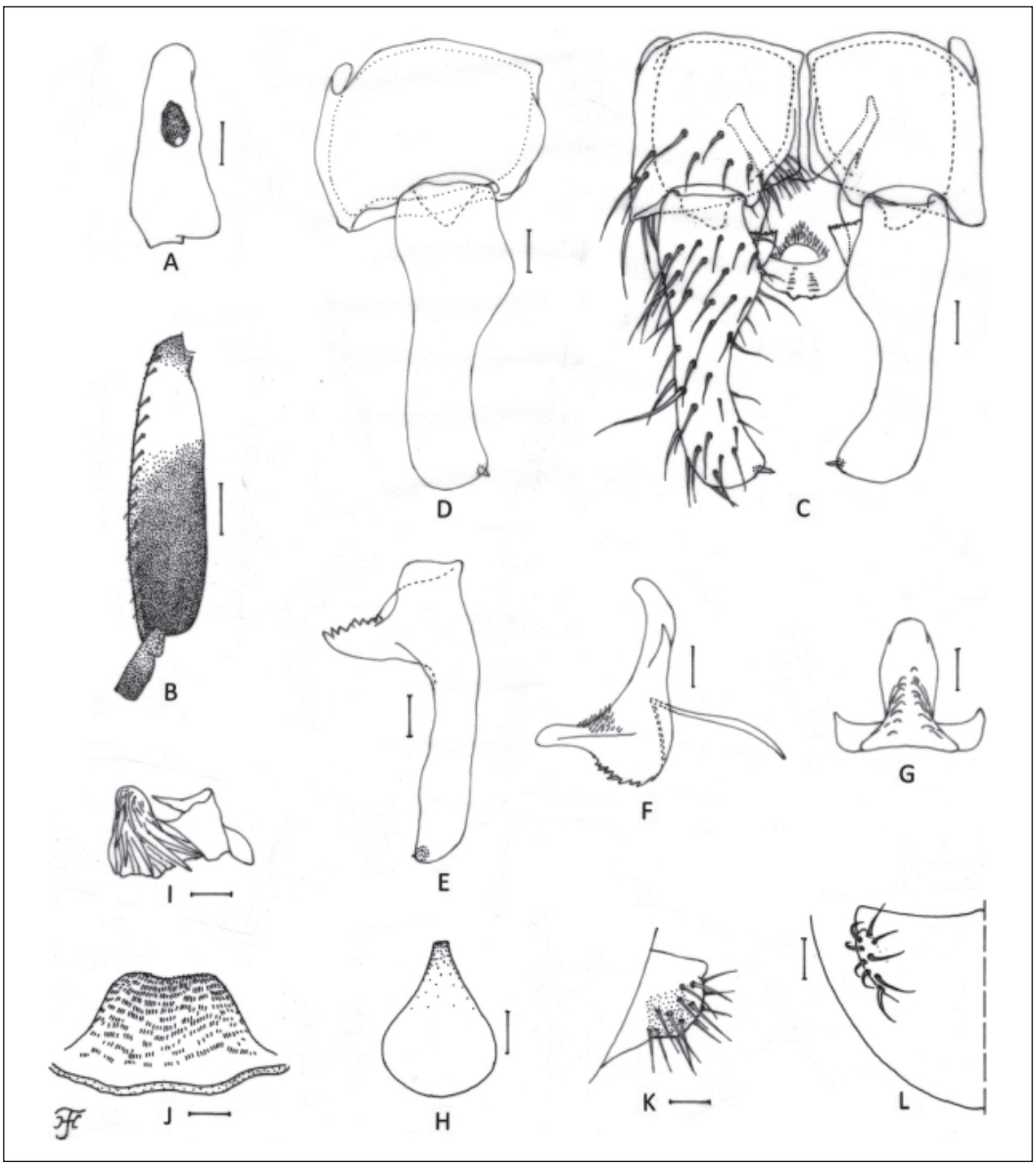

Figure 2. Male of *Simulium* (*Simulium*) *chanyae*. A, Third segment of maxillary palp with sensory vesicle (right side; front view). B, Hind basitarsus and second tarsomere (left side; outer view). C, Coxites, styles and ventral plate (ventral view). D, coxite and style (left side; ventrolateral view). E, Style (right side; outer view). F, Ventral plate and median sclerite (lateral view). G, Ventral plate (caudal view). H, Median sclerite (caudal view). I, Paramere (left side; caudal view). J, Aedeagal membrane and dorsal plate (caudal view). K & L, Abdominal segment 10 and cerci (right side; K, lateral view; L, caudal view). Scale bars. 0.1 mm for B; 0.02 mm for A and C–L.

associated pupal exuviae and cocoons) in 80% ethanol, all reared from pupae collected from a stream (width 2.5–3.0 m, depth 0.1–0.3 m, bottom rocky and muddy, water temperature 20.0ºC, shaded, elevation 1,279 m) moderately flowing, Wain-Ya Village, Taunggyi Town, Shan State, central Myanmar, 13-XI-2004.

Biological notes. The pupae of *S.* (*S.*) *chanyae* were collected from tree leaves in rapids just downstream of a small dam. Associated species were *S.* (*G.*) *gombakense*,

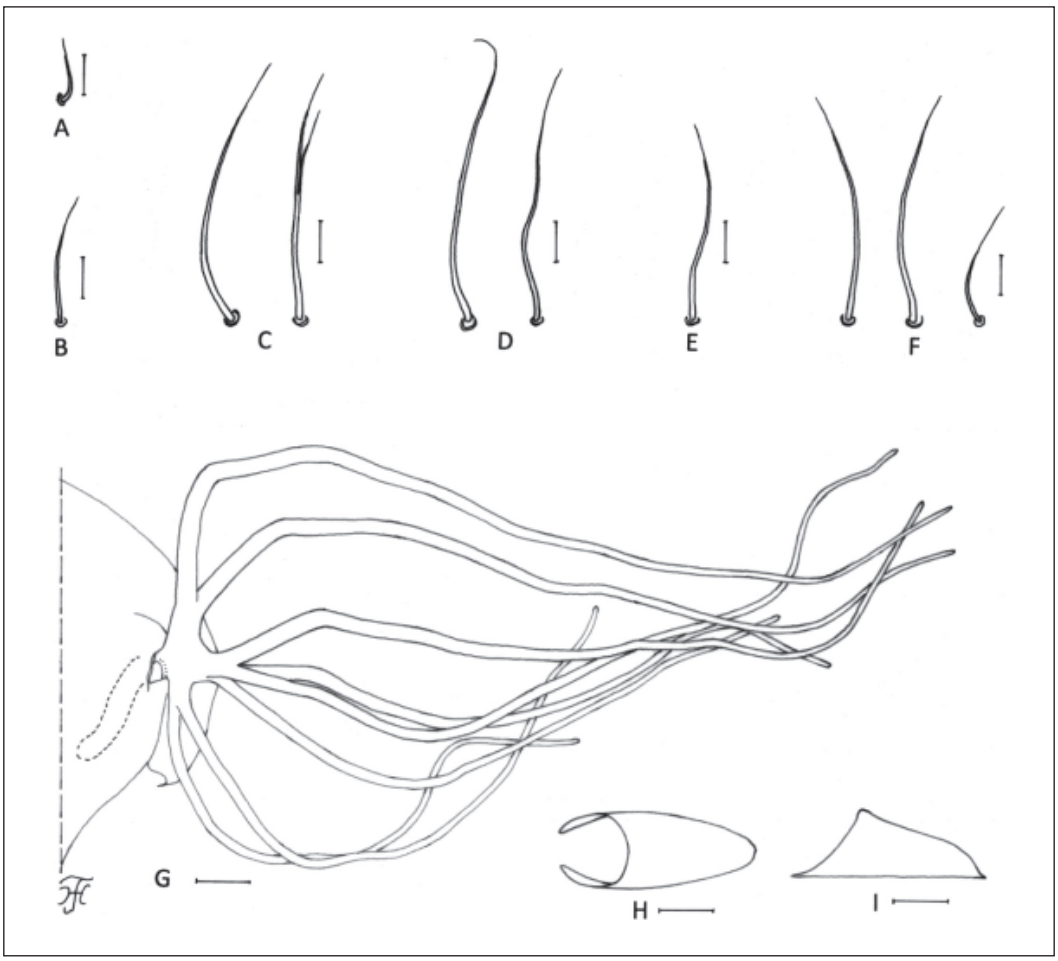

Figure 3. Pupa of *Simulium* (*Simulium*) *chanyae*. A, Frontal trichome. B, Facial trichome. C–F, Thoracic trichomes (C, anterodorsal; D, anterolateral; E, mediolateral; F, ventrolateral). G, Anterior part of thorax and gill filaments (right side; outer view). H & I, Cocoons (H, dorsal view; I, lateral view). Scale bars. 1.0 mm for H and I; 0.1 mm for G; 0.02 mm for A–F.

S. (*S.*) *himalayense* Puri, 1932, *S.* (*S.*) *nigrifacies*, *S.* (*S.*) *nodosum* and *S.* (*S.*) *tani* Takaoka & Davies, 1995 (complex).

Distribution. Myanmar (**New record**) and Thailand.

Remarks. The female of this species herein redescribed shows that specimens from Myanmar are almost indistinguishable from the original description except the smaller body size. One female has an abnormally sclerotized genital fork (Fig. 1G), and one adult fly showed a sex mosaic, which is mostly represented by the female characters except all legs which are of male character.

The male of this species is characterized by the haired subcosta, a rare character, which was found in the males of *S.* (*S.*) *hirtinervis* Edwards, 1928 from Cameron's Highland, Peninsular Malaysia (Takaoka *et al.*, 2012) and *S.* (*S.*) *laui* Takaoka & Sofian-Azirun, 2015 from Vietnam (Takaoka *et al.*, 2015) in the *S. multistriatum* species-group. However, the male of this species is distinguished from both species by the number of upper-eye large facets in 17 or 18 vertical columns and 18 or 19 horizontal rows (14 or 15 vertical columns and 15 horizontal rows in *S.* (*S.*) *hirtinervis* and

20 or 21 vertical columns and 21 horizontal rows in *S.* (*S.*) *laui*).

The pupa of *S.* (*S.*) *chanyae* is characterized by the gill filaments widely divergent when viewed laterally (Fig. 3G) and cocoon without anterolateral windows (Fig. 3H, I), the latter character rarely occurring in species of the *S. multistriatum* species-group, of which most have a cocoon with an anterolateral window on each side, and some have a shoe-shaped cocoon. *Simulium* (*S.*) *malayense* Takaoka & Davies, 1995 from Peninsular Malaysia has a simple cocoon (Takaoka & Davies, 1995), but this species differs from *S.* (*S.*) *chanyae* by the pupal head and thorax bare, as already noted by Takaoka & Choochote (2007).

***Simulium* (*Simulium*) *nigrifacies* Datta, 1974**

Simulium (*Simulium*) *nigrifacies*, Datta, 1974: 17–18 (Male and pupa).

Specimen examined. One pupal exuviae and cocoon, in 80% ethanol, collected from a small stream (width 30–50 cm, depth 2–5 cm, bottom muddy, water temperature 23.0ºC, shaded, elevation 623 m) slowly flowing, Namp-San Waterfall, Nar-Sam Village, Lashio, Shan State, central Myanmar, 9-XI-2004.

Distribution. India and Myanmar (**New record**).

Ecological notes. The pupal exuviae of this species was collected from a grass trailing in the water. Associated species were *S.* (*G.*) *gombakense* and *S.* (*S.*) *chanyae.*

Remarks. This species was described from India by Datta (1974). It is assigned to the *S. tuberosum* species-group and is characterized by the pupal gill with six short filaments, of which one of the dorsal pair of filaments is much thicker than other five filaments and lacking a pit-like organ near the base of the gill (Datta, 1974).

The pupal exuviae from Myanmar shows the same arrangement of the pupal gill filaments as that of the original description of *S.* (*S.*) *nigrifacies* (Datta, 1974).

***Simulium* (*Simulium*) *tani* Takaoka & Davies, 1995 (complex)**

Simulium (*Simulium*) *tani*: Takaoka & Davies, 1995: 137–141 (Female, male, pupa and larva).

Specimen examined. Two females and one male (with their associated pupal exuviae and cocoons) in 80% ethanol, all reared from pupae collected from a stream (width 6–8 m, depth 0.5 m, bottom rocky and muddy, water temperature 17.0ºC, partially shaded, elevation 1,371 m) moderately flowing, Nyo-Me Village, Taunggyi Town, Shan State, central Myanmar, 13-XI-2004; one female and three males (with their associated pupal exuviae and cocoons) in 80% ethanol, all reared from pupea collected from a stream (width 2.5–3.0 m, depth 0.1–0.3 m, bottom rocky and muddy, water temperature 20.0ºC, shaded, elevation 1,279 m) moderately flowing, Wain-Ya Village, Taunggyi Town, Shan State, central Myanmar, 13-XI-2004.

Biological notes. The pupae of *S.* (*S.*) *tani* (complex) were collected from tree leaves in rapids just downstream of a small dam. Associated species were *S.* (*S.*) *chanyae*, *S.* (*S.*) *himalayense* and *S.* (*S.*) *nodosum*.

Distribution. Indonesia (Sumatra), Myanmar (**New record**), Peninsular Malaysia, Taiwan, Thailand and Vietnam.

Remarks. This species is a species complex comprising 11 cytoforms, of which nine are reported from Thailand, one from Peninsular Malaysia and one from Taiwan (Adler & Crosskey, 2017). In Vietnam, one morphoform ('a') is recognized, which is chromosomally divided into two cytoforms (Adler *et al.*, 2016) and is also shown to include an additional possible cryptic taxon by a DNA sequence-based analysis (Low *et al.*, 2016). Whether populations *S.* (*S.*) *tani* (complex) from Myanmar is one of these cytoforms or not will be resolved in the future chromosomal studies.

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