



## Review of the genus *Nepaletricha* Chandler (Diptera, Rangomaramidae), with description of new species from Thailand and Vietnam

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### Abstract

The genus *Nepaletricha* consists of the following species: *N. mystica* Chandler (Nepal), *N. furcata* **sp. n.** (Thailand and Vietnam) and *N. montana* **sp. n.** (Thailand). The previously unknown female characters are described. The placement of the genus is briefly reviewed and discussed.

**Key words:** Diptera, Sciaroidea, Rangomaramidae, *Nepaletricha*, new species, Oriental region, Thailand, Vietnam

### Introduction

Chandler (2002) founded the monotypic genus *Nepaletricha* for *N. mystica* Chandler from Nepal and no further records have appeared. *Nepaletricha* is one of the genera of Sciaroidea which have been difficult to assign to any existing family. The aim of the present work is to describe two additional Oriental species, to complete the morphological analysis and diagnostics of *Nepaletricha* and to briefly review and discuss its family assignment.

### Material and methods

The material from Thailand was collected and preserved in ethanol. We detached the abdomen from most of the specimens and macerated it in warm concentrated potassium hydroxide (KOH). We then detached the hypopygium beyond segment 8 or the tip of the female abdomen beyond segment 5 or 6. After washing in water and step-wise dehydration in alcohol, we placed the parts of the abdomen for a few seconds in clove oil (eugenol), after which we mounted them in “Euparal”, in many cases between two pieces of cover glass, which enables the specimen to be studied from both sides under a compound microscope. Such preparations are now attached to glass slides by a couple of strips of adhesive tape across their edges and are easily detached when needed. Other parts of the body have not been treated with potassium hydroxide, but after dehydration we mounted them as they were in “Euparal”. Many specimens are mounted as whole, even the hypopygium or the female terminalia attached. From some specimens we have detached the head so that it can be studied in frontal view. A few specimens are still preserved in alcohol. The specimens from Vietnam are dry and mounted on 0.15 mm minuten pins. Of these the abdomens of two males were detached and treated by potassium hydroxide; after washing in water these were placed in alcohol for study under a stereomicroscope. Later the abdomens were placed in glycerol in microvials, which are attached to the pins bearing the rest of the specimens. The head and abdomen of the male in PJC collection were detached and cleared in lactic acid;

these and one wing of this specimen were mounted separately in dimethyl hydantoin formaldehyde (DMHF) and attached to the pin bearing the rest of the specimen.

Verbal description of the illustrated characters is restricted to a minimum.

Illustrations were made with the aid of a drawing tube attached to a Leitz Diaplan or Leitz Laborlux compound microscope.

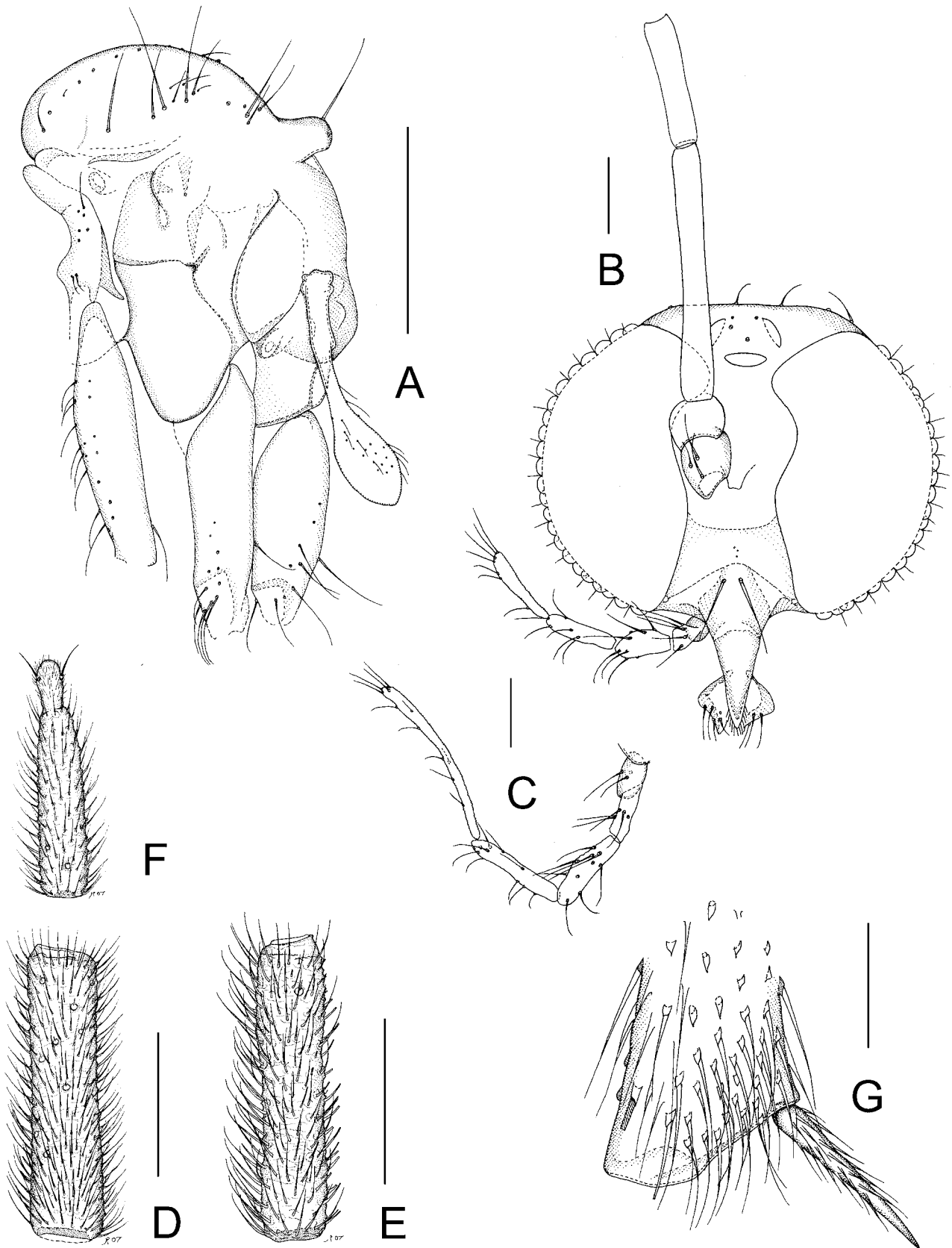
The material is preserved in the Queen Sirikit Botanical Gardens, Chiang Mai, Thailand (QSBG), Hungarian Natural History Museum, Budapest, Hungary (HNMB), the Natural History Museum, London, United Kingdom (NHM), the Swedish Museum of Natural History, Stockholm, Sweden (SMNH) and the private collection of P.J. Chandler, Melksham, United Kingdom (PJC).

### Notes on *Nepaletricha*

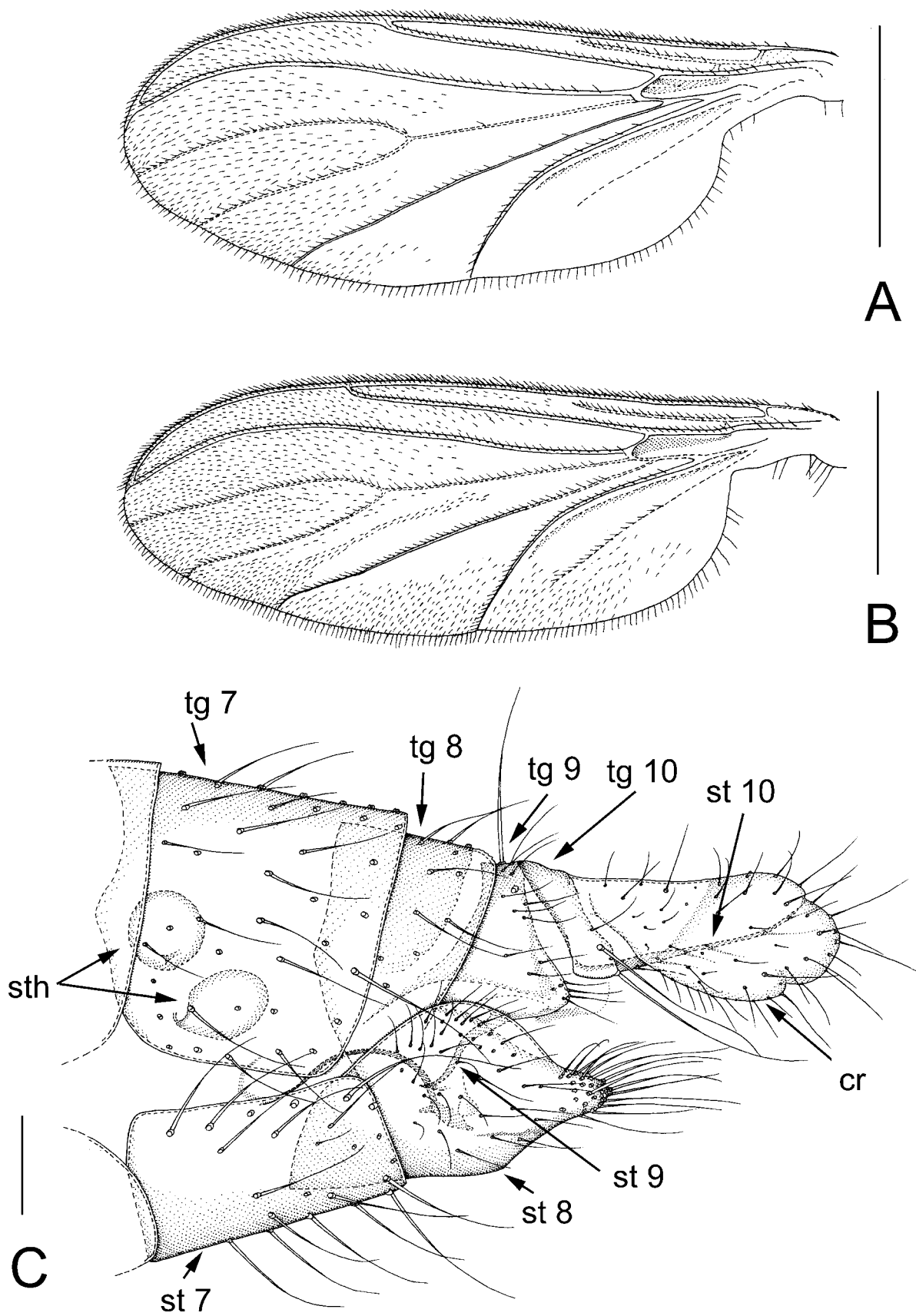
Chandler (2002) considered *Nepaletricha* as the sister group of the Afrotropical *Kenyatricha* Chandler (type species *K. elgon* Chandler) and placed both genera among the genera of the *Heterotricha* Loew group of authors which at that time was lacking a family assignment. Hippa and Vilkkamaa (2005, 2006a) found support to the sister group relationship between *Nepaletricha* and *Kenyatricha* and continued with the placement of the *Heterotricha* group in Sciaroidea incertae sedis. Jaschhof & Jaschhof (2007) described a new *Kenyatricha* like monotypic genus *Madagotricha* (*M. ranomafanae* Jaschhof & Jaschhof) from Madagascar, again placing it in Sciaroidea incertae sedis. Amorim & Rindal (2007) placed the genera of the *Heterotricha* group they studied in the family Rangomaramidae proposed by Jaschhof & Didham (2002) for the New Zealand genus *Rangomarama* (*R. edwardsi* Jaschhof & Didham). Within this family they recognized four subfamilies and included *Kenyatricha* in the subfamily Chiletrichinae, but considered *Nepaletricha* as incertae sedis because they were uncertain of its subfamilial position. We follow the recent placement of the elements of the former *Heterotricha* group in Rangomaramidae.

The diagnostic characters given for *Nepaletricha* by Chandler (2002) also apply to the new species described here, except that the submedial processes of tergite 9 are absent in *N. montana* **sp. n.** *Nepaletricha* are similar to *Kenyatricha* and *Madagotricha* but differ from both e.g. by the following characters: 1) mesepimeron is ventrally broad, not strongly narrowed, 2) there is a distinct vein  $ta$  ( $r-m$ ), in *Kenyatricha* and *Madagotricha*  $ta$  is obliterated so that radius and media touch in a point or there is a short radio-medial fusion, 3) the vein  $sc$  is setose, not non-setose or with one or two occasional setae only and 4) the gonocoxal apodemes are broadly fused anteriorly. The latter character is unique in the whole Rangomaramidae. Both *Nepaletricha* and *Kenyatricha* differ from *Madagotricha* by having five-segmented, not one-segmented, maxillary palpus.

The female characters of *Nepaletricha* have been previously unknown. The genitalia of *N. furcata* are of the simple generalized type found throughout Rangomaramidae, i. e. they lack the striking modifications of sternite 9, cerci and the setosity of abdominal segments 9 and 10 found in *Chiletricha* Chandler (*Heterotricha marginata* Edwards), *Heterotricha* Loew (*H. hirta* Loew) and *Rhynchoheterotricha* Freeman (*R. stuckenbergae* Freeman) (see Chandler 2002, Hippa & Vilkkamaa 2006b). The one-segmented cercus is a rare character, but is found in two of the four genera placed in subfamily Ohakuneinae of Rangomaramidae by Amorim & Rindal (2007), *Ohakunea* Tonnoir & Edwards and *Rogambara* Jaschhof, both of which are otherwise greatly different from *Nepaletricha*.



**FIGURE 1.** Male thorax, lateral view (A), male head, frontal view (B), male maxillary palpus, dorsal view (C), male antennal flagellomere 4, ventral view (D, E), male antennal flagellomere 14, ventral view (F) and apical part of male tibia 1, prolateral view (G). **A, C, D, F.** *Nepaletricha furcata* sp. n. (paratypes). **B, E, G.** *N. montana* sp. n. (holotype). Scale for A, B, C and G 0.5 mm, for D, E and F 0.1 mm.



**FIGURE 2.** Male (A) and female (B) wing, dorsal view and the apical part of female abdomen, lateral view (C). **A.** *Nepaletricha montana* sp. n. (holotype). **B, C.** *N. furcata* sp. n. (from Thailand). Scale for A and B 1.0 mm, for C 0.1 mm. cr = cercus, st 7–st 10 = sternites 7–10, tg 7–tg 10 = tergites 7–10, sth = spermatheca.

## The species of *Nepaletricha*

### *Nepaletricha mystica* Chandler, 2002

*Nepaletricha mystica* Chandler, 2002: 122.

**Discussion.** *N. mystica* was described from Nepal on the holotype male only (in MNHN) and has not been reported since. The species is very similar to *N. furcata* and it agrees in most respects with the description of that species given here. The distinguishing characters are discussed under *N. furcata*. In addition to the characters described by Chandler (2002) it can be added that the antenna has flagellomere 14 with the constricted distal part as figured here for *N. furcata*, that the slender apical palpomere 5 is only a little longer than palpomere 4 (about 1.3 x its length) and that vein A1 bears short setae.

### *Nepaletricha furcata* sp. n.

Figs. 1 A, C, D, F, 2 B, C, 3A–E

**Male. Head.** Similar to Fig. 1A. Flagellomere 4, Fig. 1 D; flagellomere 14, Fig. 1 F: note the constricted distal part. Palpomere 5 almost double the length of palpomere 4. Colour dark brown, maxillary palpus, antennal scapus and pedicellus paler brownish, antennal flagellum yellowish but becoming darker brownish on the distal half. **Thorax.** Fig. 1 A. Colour dark brown, scutum indistinctly paler yellowish both antero- and postero-laterally; the setae black. **Legs.** Apical part of tibia 1 similar to Fig. 1 G. Coxae and trochanters dark brown, concolorous with thorax, femora yellowish, tibiae and tarsi darker than femora, brownish. **Wing.** Similar to Fig. 1 B. Colour brownish. Wing length 3.0–3.1 mm. **Abdomen.** Dark brown, sternites and tergites concolorous or the sternites slightly paler, the setae black. Apical part of abdomen, Fig. 3 E, rotated 90 degrees beyond segment 7. Hypopygium, Figs 3 A–D. Paler than other parts of abdomen. Tergite 9 with a pair of short submedial lobes at posterior margin. Gonocoxite posteriorly with three pairs of lobes: submedial, sub-lateral and mesial. Gonocoxal apodemes complicated, anteriorly fused. Gonostylus sickle-shaped, with a sigmoid apical seta, a few additional setae on the apical part and a rounded short-setose lobe dorso-mesially. Tegmen (parameres) appearing as rounded lobes. Aedeagus, with aedeagal apodeme, appearing as a furcate sclerotization, the detailed structure of which was not more closely studied.

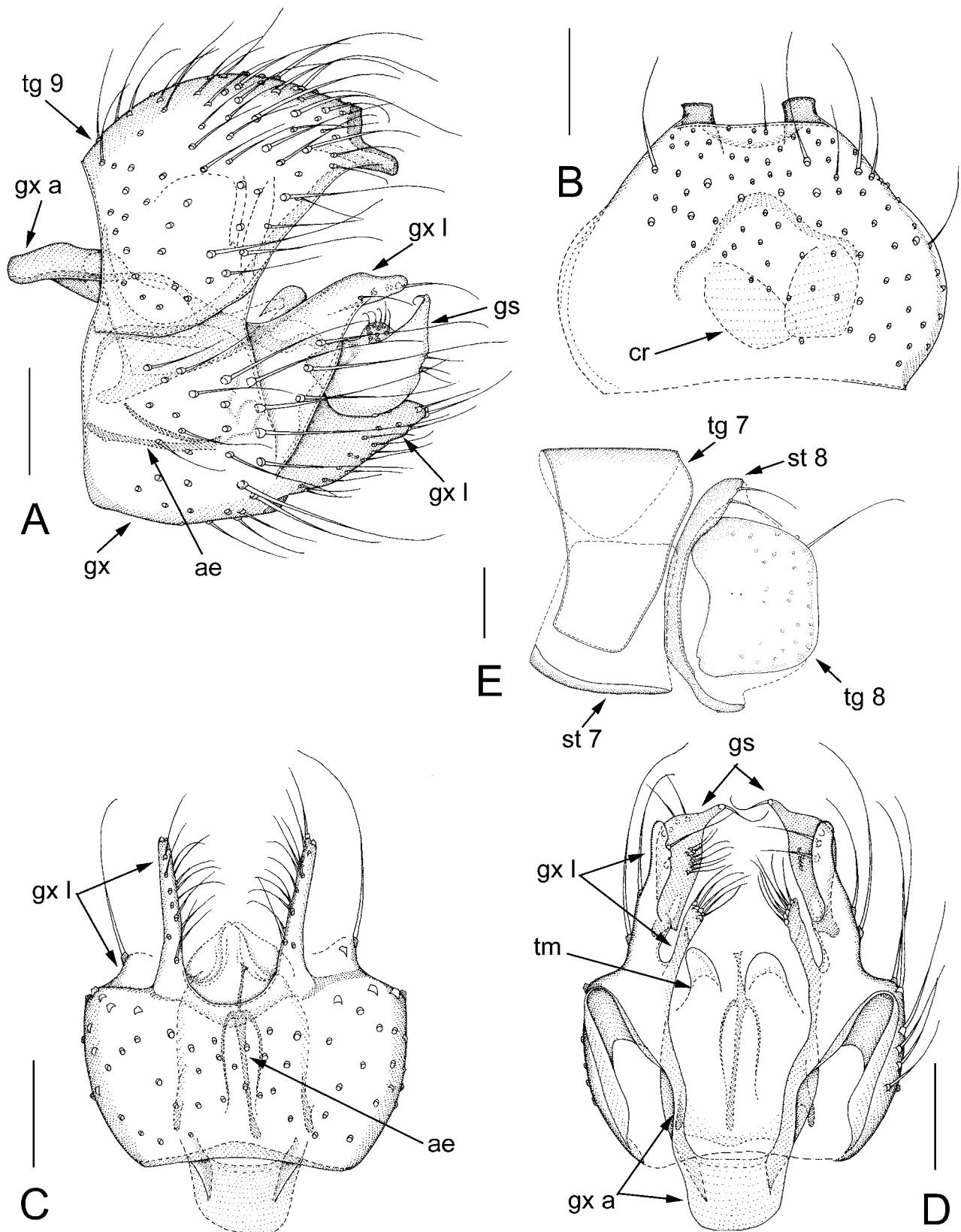
**Female.** Similar to male. Wing, Fig. 2 B, length 3.3–3.6 mm. Femora pale brown, concolorous with tibiae. Apical part of abdomen, Fig. 2 C: cerci brown, paler than the other parts of abdomen, incompletely one-segmented so that the division into a longer basal and shorter distal segments is indicated at dorsal and ventral margins. Two sclerotized spermathecae.

**Types.** *Holotype.* Male, THAILAND Chiang Mai, Doi Inthanon NP, summit marsh, 18°35.361'N 98°29.157'E, 2500m, Malaise trap 9–16.viii.2006, Y. Areeluck leg., T177 (in QSBG)

*Paratypes.* 6 males, THAILAND Chiang Mai, Doi Inthanon NP, summit marsh, 18°35.361'N 98°29.157'E, 2500m, Malaise trap 9–16.viii.2006, Y. Areeluck leg., T177 (in QSBG and NHM). 2 males (one in alcohol) with same data except 22.vii–2.viii., T 118 (in QSBG). 5 males (2 in alcohol) with same data except 2–9.viii., T. 124 (in QSBG). 4 males with same data except 16–24.viii., T184 (in QSBG and SMNH).

*Other material.* 3 females, THAILAND Chiang Mai, Doi Inthanon NP, summit marsh, 18°35.361'N 98°29.157'E, 2500m, Malaise trap 9–16.viii.2006, Y. Areeluck leg., T177 (in QSBG). 1 female with same data except 2–9.viii., T124 (in QSBG). 1 female with same data except 2–9.viii., T125 (in QSBG). 10 females (in QSBG, NHM and SMNH) with same data except 16–24.viii., T184 (in QSBG). 9 males and 1 female, VIETNAM, Lao Chai Prov., Fan-si-pan Mts. 2050 m, 5 km W of Cat Cat, 15.03.1998, at light, No: 17., Peregovits & Vásárhelyi (in HNMB and PJC).

**Etymology.** The name is from Latin, *furcata*, forked, and refers to the forked posterior margin of tergite 9.



**FIGURE 3.** *Nepaetricha furcata* sp. n. (B, C and D holotype, A paratypes). **A.** Hypopygium, lateral view. **B.** Tergite 9, dorsal view. **C.** Gonocoxae with associated structures, ventral view. **D.** Hypopygium with tergite 9 removed, dorsal view. **E.** Abdominal segments 7 and 8, “lateral view”. Scale 0.1 mm. ae = aedeagus, cr = cercus, gs = gonostylus, gx = gonocoxa, gx a = gonocoxal apodeme, gx l = gonocoxal lobe, st 7 and st 8 = sternites 7 and 8, tg 7–tg 9 = tergites 7–9, tm = tegmen/paramere.

**Discussion.** The Vietnamese males differ slightly from the males from Thailand by having the lobes at the posterior margin of tergite 9 more pointed and slightly more apart and by having the submedial lobes at the posterior margin of sternite 9 a little shorter.

*N. furcata* is similar to *N. mystica* from which it is distinguished e.g. by the following characters: 1) wing vein R5 is more strongly curved on apical part, in *N. mystica* it not dissimilar to *N. montana*, Fig. 2 A, 2) palpomere 5 almost twice as long as palpomere 4, only about 1.3 times as long in *N. mystica*, 3) the processes/lobes at the posterior margin of tergite 9 are shorter, only slightly longer than broad, in *N. mystica* they are long, nearly three times as long as basally broad, 4) in *N. furcata* the ventrolateral gonocoxal lobes/processes are elongate and tapered apically, in *N. mystica* they are broad and blunt apically; in *N. furcata* the lobes/processes are also closer to each other, separated by less than their length, in *N. mystica* they are separated by nearly twice their length, 5) in *N. mystica* the gonostylus is broadest medially and evenly narrowed apically, while it is broadest preapically and then abruptly tapered apically in *N. furcata*.

Both *N. furcata* and *N. mystica* are similar to *N. montana*. For further discussion, see under the latter.

### *Nepalotricha montana* sp. n.

Figs. 1 B, E, G, 2 A, 4 A–D

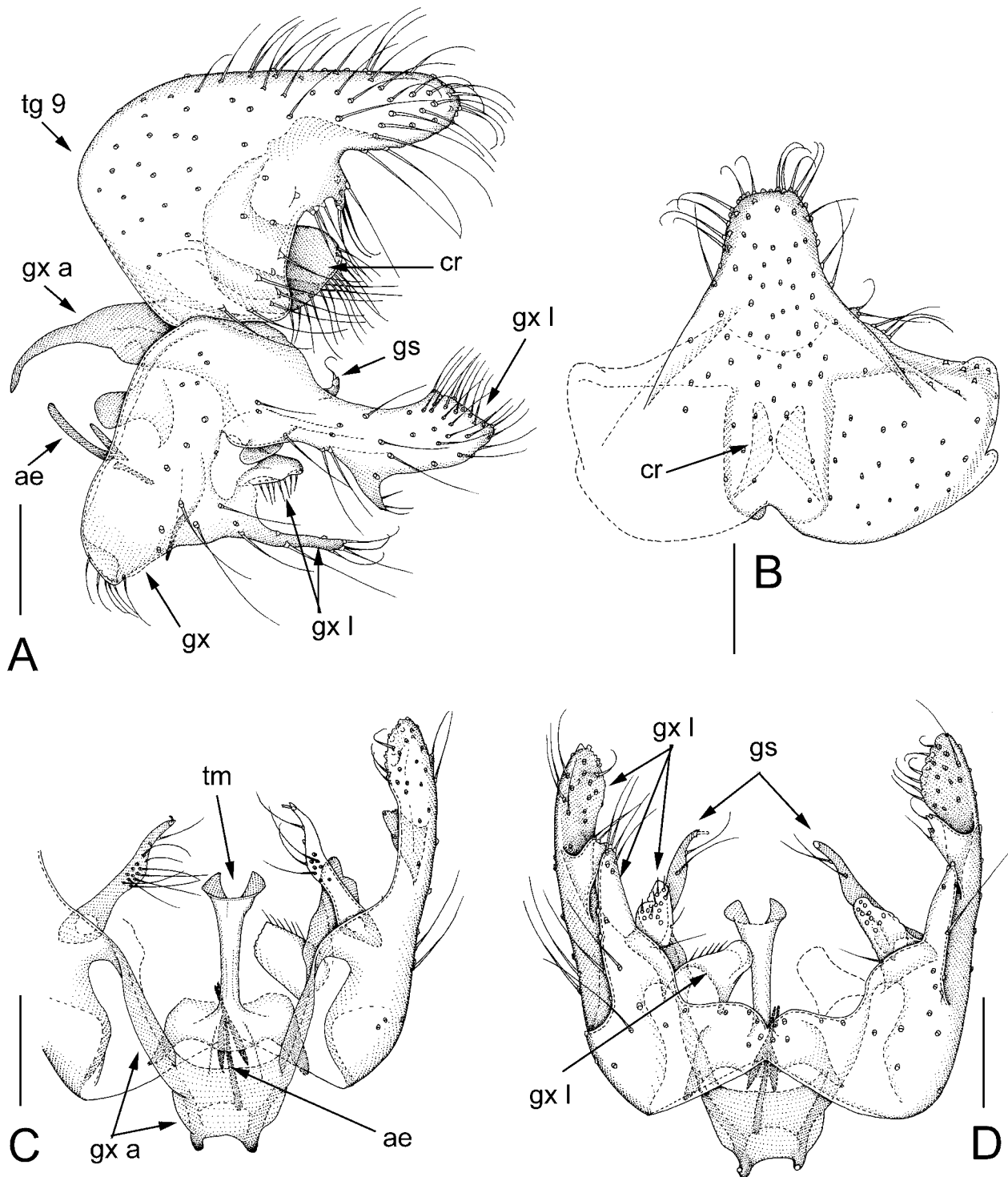
**Male. Head.** Fig. 1 B. Flagellomere 4, Fig. 1 E; flagellomere 14 broken off from both sides in the single specimen. Palpomere 5 as long as palpomere 4. Colour dark brown, maxillary palpus and antenna paler brown. **Thorax.** Similar to Fig. 1 A. Almost all the setae lost in the single specimen. Colour dark brown, scutum indistinctly paler yellowish both antero- and postero-laterally, the few remaining setae black. **Legs.** Apical part of tibia 1, Fig. 1 G. Coxae dark brown, concolorous with thorax, tibiae paler brownish. **Wing.** Fig. 2 A: note the absence of setae from A1. Colour brownish. Wing length 2.9 mm. **Abdomen.** Dark brown, sternites and tergites concolorous. Apical part of abdomen similar to Fig. 3 E, rotated 90 degrees beyond segment 7. Hypopygium, Figs 4 A–D. Slightly paler than other parts of abdomen. Tergite 9 postero-medially extended as a broad subtriangular lobe, bearing at the lateral margin a conspicuous lobe-like aggregation of setae. Gonocoxa posteriorly with four pairs of lobes: lateral, sub-lateral and two pairs of mesial ones, the lateral one again lobed at the ventral margin. Gonostylus long, narrow and slightly sigmoid in shape, with a thick sigmoid apical seta (the seta was broken before Figs 4 C and D were made), with a couple of additional setae on the apical part and a dorso-mesial aggregation of long setae. Tegmen (parameres) with a broad basal part and a funnel-like distal part. Aedeagus together with the aedeagal apodeme appearing as an arrow-shaped sclerotization, the detailed structure of which was not more closely studied.

**Female.** Unknown.

**Types.** *Holotype.* Male, Thailand, Chiang Mai, Doi Inthanon NP, summit marsh 18°35.361'N 98°29.157'E 2500m, Malaise trap 16–24.viii.2006, Y. Areeluck leg. T184 (in QSBG).

**Etymology.** The name is from Latin, *montana*, of mountains, referring to the habitat in high altitude.

**Discussion.** *N. montana* is similar to *N. furcata* and *N. mystica*. It can be distinguished from both of these e.g. by the following characters. 1) palpomere 5 is as long as palpomere 4, not longer, 2) wing membrane posterior to CuA and vein A1 are non-setose, not-setose, 3) male abdominal tergite 9 has a broad postero-medial lobe/process, in *N. furcata* and *N. mystica* there is a pair of narrow lobes/processes, 4) the lateral lobe of the gonocoxa has a tooth-like projection at the ventral margin. *N. montana* differs from *N. furcata* and is similar to *N. mystica* by having the apical part of vein R5 less strongly curved (Figs 2 A and B) and is closer to it in the proportions of the palpomeres.



**FIGURE 4.** *Nepalectricha montana* sp. n. (holotype): **A.** Hypopygium, lateral view. **B.** Tergite 9, dorsal view. **C.** Hypopygium with tergite 9 removed, dorsal view. **D.** Gonocoxae with associated structures, ventral view. Scale 0.1 mm. ae = aedeagus, cr = cercus, gs = gonostylus, gx = gonocoxa, gx a = gonocoxal apodeme, gx l = gonocoxal lobe, tg 9 = tergite 9, tm = tegmen/paramere.

#### Acknowledgements.

Our special thanks are due to Dr Brian Brown, Los Angeles, California, and Prof. Michael Sharkey,



Lexington, Kentucky, for the privilege of studying the material collected in Thailand by the “Thailand Inventory Group for Entomological Research (TIGER) project”. The project is funded by U. S. National Science Foundation grant DEB-0542864 to M. Sharkey and B. Brown. The project is supported by the National Research Council of Thailand and the Department of National Parks, Wildlife and Plant Conservation, Thailand, who gave permission for research and the collection of specimens. Mr Jarmo Pelli, Stockholm, made the illustrations of the antennal flagellomeres.

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