

## Revision of the *Trichoclinocera dasyscutellum* Group from East Asia (Diptera: Empididae: Clinocerinae)<sup>1</sup>

Bradley J. SINCLAIR<sup>2</sup> & Toyohei SAIGUSA<sup>3</sup>

<sup>2</sup>Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany  
<sup>3</sup>Fukuoka, Japan

**Abstract.** The *Trichoclinocera dasyscutellum* group is revised and includes the following eight species: *T. asiatica* sp. nov., *T. dasyscutellum* (Saigusa), *T. feuerborni* (Engel) comb. nov., *T. fluviatilis* (Brunetti), *T. naumanni* sp. nov., *T. nepalensis* sp. nov., *T. taiwanensis* sp. nov., and *T. yunnana* sp. nov. This group is restricted to East Asia, ranging from Nepal to Japan and as far south as Java. Male genitalia are illustrated and a key to species is provided. *Clinocera velutina* (Engel), originally published together with *T. feuerborni*, is also redescribed. Lectotypes are designated for both species.

**Key words:** Taxonomy, aquatic, new species, morphology, genitalia

### 1. INTRODUCTION

The genus *Trichoclinocera* Collin is among the most commonly collected clinocerines in North America and Japan. They are normally encountered on emergent rocks in large streams and rivers, usually where the riparian vegetation is open overhead (SINCLAIR 1994). Adults fly close to the water surface in search of prey and consequently are difficult to collect by sweep net and rarely taken in malaise traps. They are most readily collected by use of an aspirator, sucking up individual specimens that are found sitting on emergent rocks in the stream.

There are currently 24 described species found in the Nearctic, Palearctic and Oriental Regions (SINCLAIR 1994, 1995), plus a recently described species from India (WAGNER et al. 2004). The genus was thoroughly redescribed and divided into six species-groups by SINCLAIR (1994). The *T. dasyscutellum* group, the focus of this paper, is considered the sister clade to the western North American *T. comata* group on the basis of setulae on the scutellum. The recently described species, *T. serrata* Wagner & Leese, 2004 lacks this feature and can not be assigned to the *T. dasyscutellum* group, and is most closely related to *T. cyanescens* Vaillant, 1960.

Numerous congeneric species from East Asia await description and this paper is the first of a series of studies of this genus from this region. This study is dedicated in the memory of our colleague and fellow entomologist, Dr. Clas M. NAUMANN.

### 2. MATERIALS AND METHODS

This study is based on some 1600 specimens borrowed from or deposited in the following institutions: Biosystematics Laboratory, Kyushu University, Fukuoka, Japan (BLKU); The Natural History Museum, London, England (BMNH); Bernice P. Bishop Museum, Honolulu, USA (BPBM); Canadian National Insect Collection, Ottawa, Canada (CNC); Hungarian Natural History Museum, Budapest (HNHM); Faculty of Agriculture, Hokkaido University, Sapporo, Japan (HUS); Staatliches Museum für Naturkunde, Stuttgart, Germany (SMNS); Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany (ZFMK); Zoological Survey of India, New Alipore, Calcutta, India (ZSI).

Terms and methods used in specimen preparation follow that of SINCLAIR (1994, 1995). The use of a very mild acid (e.g., lactic acid) for clearing and studying the genitalia of male *Trichoclinocera* is very important. Strong acids such as KOH often destroy the delicate membranous tip of the phallus. The following abbreviations are used in the description: acr - acrostichal setulae; dc - dorsocentral bristles; dm - discal medial; npl - notopleural bristles; pal - postalar bristles; ph - post-humeral bristle; pprn - postpronotal bristles; presut spal - presutural supra-alar bristles; psut spal - postsutural supra-alar bristles; R - radial vein; sctl - scutellar bristles; T - tergite. Also the following abbreviations are used for the most frequent collectors' names: J. Emoto - JE; R. Matsumoto - RM; H. Shima - HS; B.J. Sinclair - BJS; T. Saigusa - TS.

<sup>1</sup> In commemoration of Clas Michael Naumann zu Königsbrück (26.06.1939 – 15.02.2004)

### 3. TAXONOMY

#### 3.1. *Trichoclinocera dasyscutellum* group

This species group is distinguished from other species of *Trichoclinocera* by the following suite of characters: long, slender legs; pronounced rows of stout ventral bristles on the fore femur absent; normally only spine-like preapical bristles present on femora (Figs. 22-27); lacking anterodorsal and posterodorsal leg bristles; scutellum with setulae on disc; face generally flat, with small apical notch (Fig. 19); cell dm produced apically, not truncate; surstylus normally with scolex-like apex; phallus with short, elaborate membranous apical lobes.

#### 3.2. Key to species of the *Trichoclinocera dasyscutellum* group

- 1 Dorsocentral bristles longer than ocellar bristles or two-thirds length of antennal arista-like style..... 2
  - Dorsocentral bristles shorter than ocellar bristles or one-half length of antennal arista-like style..... 3
- 2 Hind tibia with posterodorsal spur-like bristle one-third from base; one slender lower notopleural bristle; clasping cercus tapered and narrow apically (Fig. 2) (Japan)..... *T. dasyscutellum* (Saigusa)
  - Hind tibia without spur-like bristle; 2-3 stout lower notopleural bristles; clasping cercus rounded apically (Fig. 1) (South Korea, Russia: Primorsk Territory) ..... *T. asiatica* sp. nov.
- 3 Pleura brown, lacking distinct blue pruinescence..... 4
  - Pleura with distinct blue pruinescence..... 6
- 4 Radial vein with 3-5 erect bristles proximal to origin of Rs, ca. one-half length of basal costal bristle, in addition to setulae (Java) ..... *T. feuerborni* (Engel) comb. nov.
  - Radial vein with setulae only, lacking long erect bristles ..... 5
- 5 Male fore femur with two black, spur-like anteroventral subapical bristles and posteroventral row of numerous stout bristles, those on basal half nearly subequal to width of femur; clasping cercus strongly hooked and tapered; surstylus with scolex-like apex (Fig. 6); female fore femur with 3-4 distinct spur-like subapical bristles (China)..... *T. naumanni* sp. nov.
  - Male fore femur with one black, spur-like anteroventral subapical bristle and a sparse posteroventral row of pale hairs, those on basal half less than width of femur (Fig. 25); clasping cercus finger-like, slightly curved; surstylus with subapical pointed projection and stout apical bristle; female fore femur with one distinct spur-like subapical bristle (Fig. 8) (Nepal, Vietnam)..... *T. nepalensis* sp. nov.
- 6 Base of stalk of halter brown, not brightly coloured; anterior apex of phallus with long, slender pointed membranous sac (Fig. 10) (Taiwan) ..... *T. taiwanensis* sp. nov.
  - Base of stalk of halter bright orange-brown; anterior apex of phallus with short, broad membranous sac (females difficult to distinguish beyond this couplet) ..... 7
- 7 Clasping cercus straight beyond base, tapered only at extreme apex; length of surstylus less than half length of cercus with narrow angular basal prolongation (Fig. 5) (India, Nepal, China: Yunnan)..... *T. fluviatilis* (Brunetti)
  - Clasping cercus arched throughout length, apical fourth tapered to slender apex; length of surstylus more than half length of cercus with rounded (Fig. 11) or broad angular basal prolongation (China, Vietnam)..... *T. yunnana* sp. nov.

#### 3.3. *Trichoclinocera asiatica* sp. nov. (Figs. 1, 7, 22)

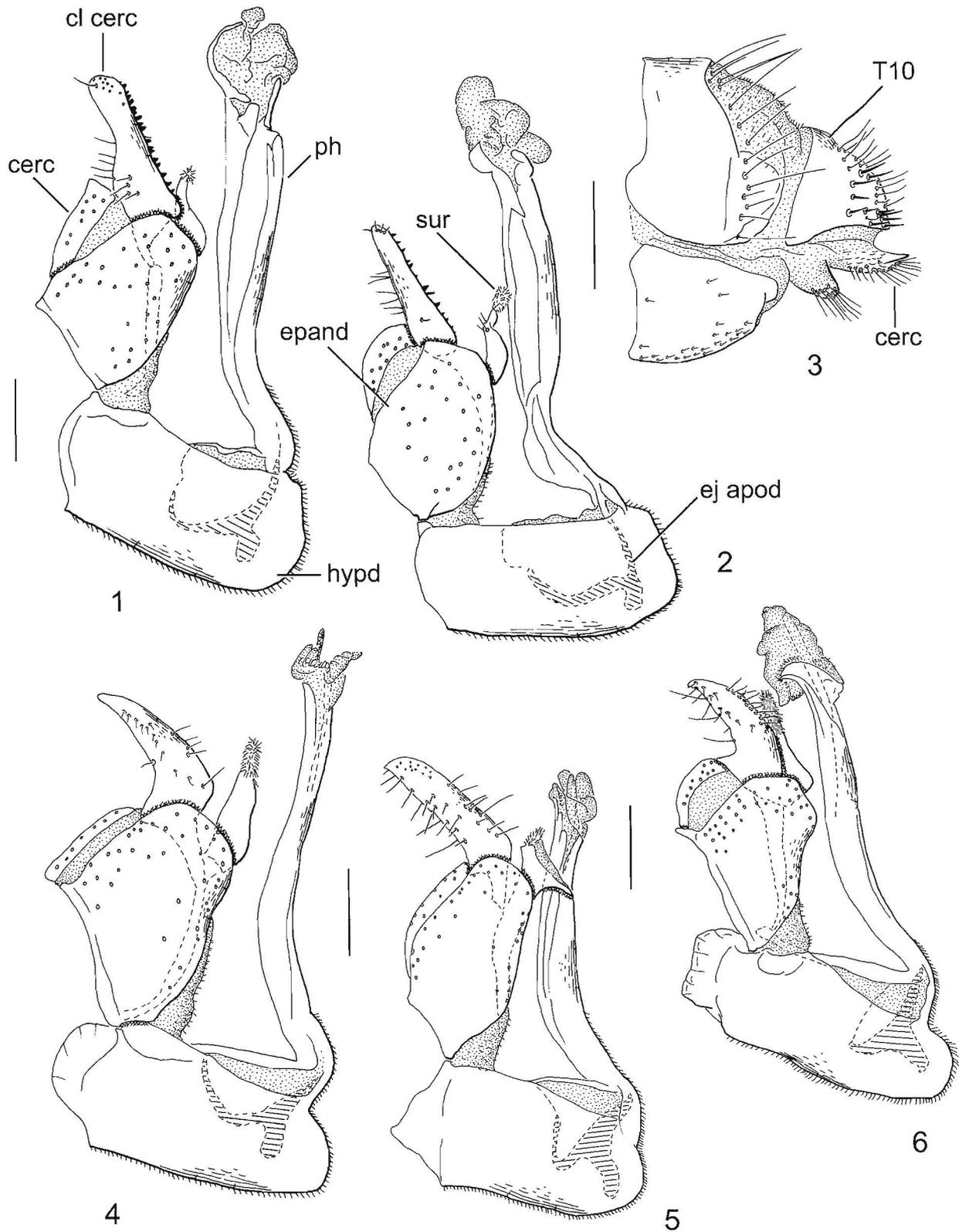
**Type Material.** Holotype male labelled: "USSR: Primor'ye/ 17km SSW of/ Krounovka, 140m/ 29.vii.1990/ T. Saigusa leg." (BLKU).

Paratypes: RUSSIA: 141 ♂, 299 ♀, 28-29.vii.1991, same data as holotype (BLKU); 23 ♂, 58 ♀, Primorskij Kraj [Primorsk Terr.], SW Krounovka, nr. Mt Medvezh'ja, 8-9.vii.1993, T. Yasunaga (BLKU); 2 ♂, 9 ♀, Primorskij Kraj, SW Krounovka, nr. Mt Medvezh'ja, 4-6.vii.1993, T. Nakamura (BLKU). SOUTH KOREA: 1 ♂, Samjeong, Hwagae-Myeon, 600-800 m, 8.vi.1991, TS (BLKU). Several specimens deposited in ZFMK.

**Recognition.** This species is distinguished by its yellowish coxae, long dorsocentral bristles and 2-3 stout, lower notopleural bristles.

**Description.** Wing length 3.6-4.2 mm

**Male.** Brown in ground colour. Head rounded; compound eye large, rounded. Face narrowest at middle, ca. width of antennal sockets, with bright blue pruinescence, lower margin of face nearly straight (clypeus) lacking pronounced carina or notch; width of gena one-sixth height of eye. Anterior margin of ocellar triangle, lateral postocciput and gena with blue pruinescence; vertex and upper part of postocciput dark when viewed dorsally. Ocellar bristles longest among cranial bristles; occiput with 3 pairs of bristles posterior to ocellar triangle, ca. one-half length of ocellar bristles; postocular with row of short bristles along margin of eye, upper 3-4 bristles darker and more stout than lower bristles. Arista-like stylus short and slender, slightly tapered apically. Palpus slender, length less than one-half height of eye.



**Figs. 1-6:** Terminalia of *Trichoclinocera dasyscutellum* group. (1) *T. asiatica* sp. nov., male; (2) *T. dasyscutellum* (Saigusa), male; (3) *T. dasyscutellum* (Saigusa), female; (4) *T. feuerborni* (Engel), male; (5) *T. fluviatilis* (Brunetti), male; (6) *T. naumanni* sp. nov., male. Scale bar = 0.1 mm. Abbreviations: cerc - cercus; cl cerc - clasper; ej apod - ejaculatory apodeme; epand - epandrium; hypd - hypandrium; ph - phallus; sur - surstylus; T - tergite.

Pleura and lateral margin of scutum, including postpronotal lobe and notopleuron entirely clothed in blue pruinescence; posterolateral corner of scutum near postalar ridge somewhat paler. Thoracic bristles long, some longer than width of eye; several acr anterior to first dc; 5 pairs dc; 1 pprn; 1 presut spal; 1 upper, 2-3 stout lower npl; 1 psut spal; 1 pal; 2 pairs setl and numerous pale setulae on disc; several pale bristles on notopleural depression. Laterotergite with patch of pale bristles; prothoracic episternum, katapisternum, and hind margins of metepisternum with long, pale hairs.

Wing narrow, infusate; narrow, faint, parallel-sided stigma present. One long, basal costal bristle, subequal to length of posterior dc. Row of setulae from base of R to tip of R<sub>1</sub>; cell dm strongly produced apically; R<sub>4</sub> and R<sub>5</sub> divergent apically. Halter dark with pale base.

Legs with femora pale brown beneath and basally, becoming darker toward apex. Coxae with long pale, marginal hairs; fore coxa yellowish with blue pruinescence on basal half; mid and hind coxae somewhat pale with blue pruinescence. Fore femur with row of 6-7 slender anterior bristles on apical third (Fig. 22), dorsal to spine-like bristles; antero- and posteroventral row of pale, slender bristles along entire length, posteroventral setae subequal to width of femur, twice length of anteroventral bristles; 3 black, very short, peg-like anteroventral bristles on apical third; anterodorsal region with row of 5-6 stout, black bristles on basal third. Fore tibia with biserial row of short, stout bristles beneath. Mid femur with 3 pairs of black, spine-like antero- and posteroventral preapical bristles, nearly as long as one-half width of femur; anterior margin with long, slender bristles along entire length, longer than width of femur; lacking erect antero- and posterodorsal bristles. Hind femur with 2-3 pairs of antero- and posteroventral preapical bristles, less stout than preapical bristles of mid femur; lacking antero- and posterodorsal bristles. Hind tibia with 3-4 erect, spine-like dorsal and ventral bristles on apical third, longer than width of tibia. Tarsi longer than corresponding tibiae. Empodium pulvilliform, subequal in length to claw, less than one-half length of tarsomere.

Hypandrium (Fig. 1) long and cylindrical, longer than epandrium. Phallus long, distinctly bent sub-basally; apex with slender, curved anterior process and pair of straight, short, rod-like posterior processes; ejaculatory apodeme strongly recurved anteriorly. Surstylus very slender, somewhat twisted and arched medially, with membranous oval scolex-like apex. Clasper slender, finger-like, parallel-sided, with rounded apex; row of stout, peg-like bristles on inner dorsal margin.

**Female.** Similar to male except as follows: stout anteroventral bristles on apical third of fore femur longer and stouter. Terminalia very similar to *T. dasyscutellum*:

sclerites of segment 8 narrowly separated laterally; T8 with posterior row of long and short bristles, length of dorsal bristles subequal to length of sclerite; T10 with stout, curved bristles on posterior half, with 3-4 apical bristles more stout than remaining bristles; anteroventral corner of T10 not narrowed and prolonged.

#### **Geographical Distribution and Seasonal Occurrence.**

This species occurs in the far east of Asia, specifically the Primorsk Territory of Russia and the Korean Peninsula (Fig. 7).

**Remarks.** See under *T. dasyscutellum*.

**Etymology.** The specific name refers to the distribution of this species along the far eastern region of mainland Asia.

#### **3.4. *Trichoclinocera dasyscutellum* (Saigusa)**

(Figs. 2, 3, 7, 13, 18-20, 23)

*Acanthoclinocera dasyscutellum* Saigusa, 1965: 54.

*Trichoclinocera dasyscutellum*: SINCLAIR 1994: 1015.

**Type Material.** Holotype, male labelled: "[HONSHU]/ Kanayama/ YAMANASHI/ 19.VIII.1962/ T. SAIGUSA" (BLKU).

Paratypes: 2 ♂, 1 ♀, same data as holotype (CNC); 21 ♂, 17 ♀, same data as holotype (BLKU).

**Additional Material.** (375 specimens) JAPAN: **Akita:** Kuroyu, Hachimantai, 8.vii.1962 (BLKU). **Nyntosan,** Hachimantai, 9.vii.1962 (BLKU). **Aomori:** Oirase-keikoku nr. Tawadoko, 14.viii.1962 (BLKU). **Gifu:** Futatsuya, Kawai-mura, 11.vi.1977 (BLKU). **Iwate:** Hayachinesan, 800-1000 m, 24.vii.1973 (BLKU); Hata-tine, 4.viii.1964 (HUS). **Nagano:** Inakoyu, 14.viii.1975 (BLKU); Inakoyu, Kitayatsugatake, 14.viii.1975 (BLKU); Iwanadome, Shimashima, 13.vii.1963 (BLKU); Tobirakôsen, Utsugushigaharn, 18.vii.1963 (BLKU). **Yamanashi:** Hirogawara, Kitadake, 18-19.viii.1978 (BLKU); Kanayama, Kinpusan, 1.vii.1963 (BLKU); Kanayama, Sudama, 10-11.viii.1961, 6.vii.1962, 30.vi., 24.viii.1963, 12-13.viii.1973, 20,30.vi., 2-31.viii., 1,16.ix.1975 (BLKU); Kanayama, Kanayamotôge, 2.vii.1963 (BLKU); Motodanigawa, Kanayama, 9.vii.1975 (BLKU); Tokusatôge, Sudama, 23.vi.1975 (BLKU). Several specimens deposited in BMNH and ZFMK.

**Recognition.** This species is readily distinguished from other species of the *T. dasyscutellum* group by the reddish-brown coloured legs, long dorsocentral bristles and spur-like bristle on the hind tibia.

**Description.** Wing length 3.6-4.2 mm.

**Male.** Dark brown to black in ground colour. Head rounded; compound eye large, rounded. Face narrowest at middle, ca. width of antennal sockets, with pale blue

pruinescence, lower margin of face nearly straight, lacking pronounced carina or notch (Fig. 19); width of gena one-sixth height of eye. Ocellar bristles longest among cranial bristles; occiput with 3 pairs of bristles posterior to ocellar triangle; postocular with row of short bristles along margin of eye, upper 3-4 bristles darker and more stout than lower bristles. Arista-like stylus long and slender, tapered apically. Palpus slender, length less than one-half height of eye.

Pleura entirely clothed in blue pruinescence; posterolateral corner of scutum near postalar ridge pale brown. Thoracic bristles long, some longer than width of eye; several acr anterior to first dc; 5-6 pairs dc; 1 ppn; 1 presut spal; 2 npl; 2 psut spal; 1 pal; 2 pairs sclt and numerous pale setulae on disc; several pale bristles on notopleural depression. Laterotergite with patch of pale bristles; prothoracic episternum, katapisternum, and hind margins of metepisternum with long, pale hairs.

Wing (Fig. 13) narrow, infusate; narrow, faint, parallel-sided stigma present. One long, basal costal bristle, subequal to length of posterior dc; often 1 proximal costal bristle, shorter than one-half length of basal bristle. Row of setulae from base of R to tip of R<sub>1</sub>; cell dm strongly produced apically; R<sub>4</sub> and R<sub>5</sub> slightly divergent. Halter brown with pale base.

Legs reddish-brown, darker toward apex. Coxae with long pale, marginal hairs; mid and hind coxae with tinge of pale pruinescence. Fore femur with 4-5 slender anterior bristles on apical third, dorsal to spine-like bristles (Fig. 23); antero- and posteroventral row of long, pale slender bristles along entire length, slightly longer than width of femur; 4-5 black, spine-like anteroventral bristles on apical fourth; anterodorsal region with row of short, stout, black bristles on basal third. Fore tibia with anteroventral row of short, stout bristles and posteroventral row of slender bristles. Mid femur with pair of black, spine-like antero- and posteroventral preapical bristles, longer and more slender than corresponding bristles of fore femur; lacking erect antero- and posterodorsal bristles. Hind femur with 1-2 stout anteroventral preapical bristles, similar to mid femur; lacking antero- and posterodorsal bristles. Hind tibia with posterodorsal spur-like bristle one-third from base, slightly longer than width of tibia; 2-3 posterodorsal preapical spine-like bristles, longer than width of tibia. Tarsi longer than corresponding tibiae. Empodium pulvilliform, subequal in length to claw, less than one-half length of tarsomere.

Hypandrium (Fig. 2) long and cylindrical, longer than epandrium. Phallus long, distinctly bent sub-basally; apex with cup-shaped process; ejaculatory apodeme gently recurved anteriorly. Surstylus very slender, somewhat twisted and arched medially, with membra-

nous oval scolex-like apex. Claspings cercus slender, finger-like, bearing stout bristles on inner dorsal margin.

**Female.** Similar to male except as follows: fore tibia lacking modified bristles beneath. Terminalia: sclerites of segment 8 narrowly separated laterally; T8 with posterior row of long bristles, subequal to length of sclerite (Fig. 3); T10 with stout, curved bristles along inner and posterior margins, with 3-4 apical bristles more stout than remaining bristles; anteroventral corner of T10 not strongly narrowed and prolonged.

#### **Geographical Distribution and Seasonal Occurrence.**

This species is restricted to the Japanese island of Honshu (Fig. 7), with flight records from mid-June to mid-September.

**Remarks.** This species was originally assigned to the genus *Acanthoclinocera* Saigusa, but was transferred to *Trichoclinocera* when the former was considered to be congeneric (SINCLAIR 1994). *Trichoclinocera dasyscutellum* is most closely related phylogenetically to *T. asiatica* on the basis of the long thoracic bristles and similarities of the claspings cercus and apex of the phallus.

#### **3.5. *Trichoclinocera feuerborni* (Engel) comb. nov.** (Fig. 4)

*Clinocera* (s.s.) *feuerborni* Engel, 1931: 487.

**Type Material.** Lectotype male (here designated) labelled: "FS 2a. 6/XII"; "Ngatitoga-Fall/ b. Sarangan. M. Java./ 6.XII.28. (Feuerborn.) [hand-written]"; "[red label, no writing]"; "♀ Clin./ Feuerborni n.sp./ det. Engel" (SMNS). A lectotype label "LECTOTYPE/ of Clinocera/ feuerborni Engel/ des. B.J. Sinclair 2004 [red label]" has been attached to this specimen.

Paralectotype: Same data as lectotype, with a yellow paralectotype label attached (1 ♀, SMNS) [abdomen glued to thorax].

ENGEL (1931) writes that the two type specimens were stored in alcohol, but it must have been dried by him subsequently. ENGEL (1931) also described the species *Kowarzia velutina* (also based on two specimens) in the same publication (see Appendix), and given that there were four specimens all bearing red labels (without writing) stored together under the label *Clinocera feuerborni*, it appears that the type material of these two species were subsequently mixed. Consequently lectotypes are designated for both species at this time to clearly distinguish the type material of these two species.

**Recognition.** This species is distinguished from other species of the *T. dasyscutellum* group by its brown ground colour and long bristles on the radial vein.

**Description.** Wing length 4.0-4.1 mm.

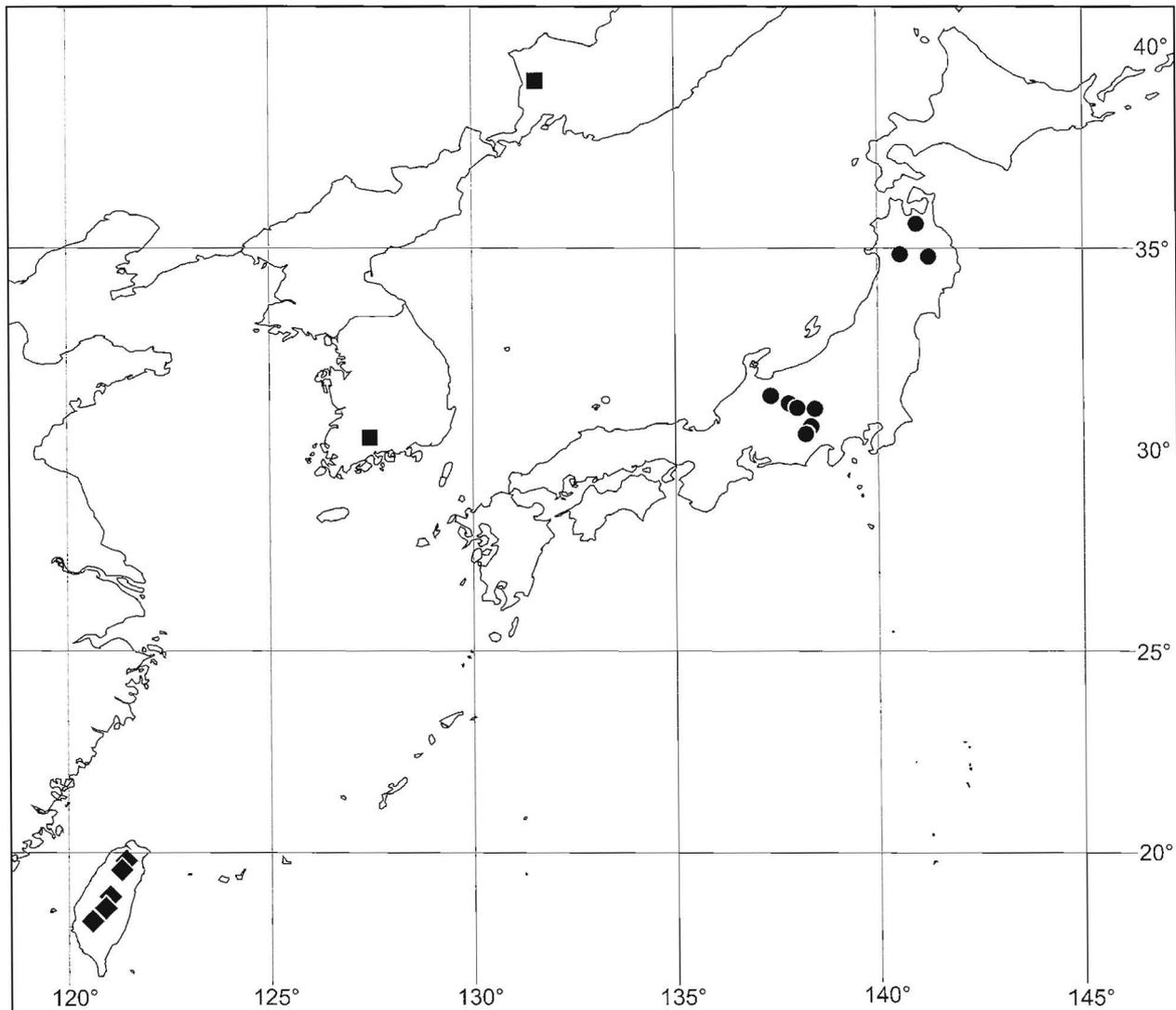


Fig. 7: Known distribution of species of *Trichoclinocera dasyscutellum* group. *T. asiatica* sp. nov. (■), *T. dasyscutellum* (Sai-gusa) (●), *T. taiwanensis* sp. nov. (◆).

**Male.** Dark brown in ground colour. Head rounded; compound eyes large, rounded. Face narrowest at middle, ca. width of antennal sockets, with pale blue pruinescence on lower half, lower margin of face with slightly pronounced carina or notch; width of gena one-fifth height of eye. Ocellar bristles longest among cranial bristles; occiput with 3 pairs of bristles posterior to ocellar triangle; postocular with row of short bristles along margin of eye, upper 3-4 bristles darker and more stout than lower bristles. Arista-like stylus long and slender, only slightly tapered apically. Palpus slender, length less than one-half height of eye.

Pleura, postpronotal lobe and notopleural depression entirely clothed in pale blue pruinescence. Thoracic bristles well developed, all shorter than width of eye; acr absent; 5 pairs dc; 1 ppm; 1 presut spal; 2 npl; 2 psut spal; 1 pal; 2 pairs sctl and numerous setulae on disc;

several pale bristles on notopleural depression. Laterotergite with patch of pale bristles; prothoracic episternum, katepisternum, and hind margins of metepisternum lacking long pale hairs.

Wing narrow, infusate; narrow, faint, parallel-sided stigma present. One long, basal costal bristle, subequal to length of sctl. Row of setulae from base of R to tip of  $R_1$ , with 3-5 outstanding bristles proximal to origin of Rs ca. one-half length of basal costal bristle; cell dm long, strongly produced apically;  $R_4$  and  $R_5$  very slightly divergent. Halter brown with pale base.

Legs pale brown, darker toward apex. Coxae with long pale, marginal hairs; mid and hind coxae with tinge of pale pruinescence. Fore femur lacking anterior bristles and spine-like bristles; antero- and posteroventral margins with row of long, pale slender bristles along entire

length, shorter than width of femur; posteroventral base with 1 long bristle, ca. twice width of femur. Fore tibia with antero- and posteroventral row of short stout bristles. Mid femur lacking spine-like preapical bristles, all outstanding erect bristles lacking, except several slender preapical anteroventral bristles. Hind femur with 1-2 slender anteroventral preapical bristles, similar to mid femur; lacking antero- and posterodorsal bristles. Hind tibia lacking posterodorsal spur-like bristle; 2-3 erect anteroventral preapical bristles, longer than width of tibia. Tarsi longer than corresponding tibiae. Empodium pulvilliform, subequal in length to claw, less than one-half length of tarsomere.

Hypandrium (Fig. 4) long and cylindrical, longer than epandrium. Phallus long, distinctly bent sub-basally; apex with narrow lateral membranous ridges; ejaculatory apodeme gently recurved anteriorly. Surstylus tapered, with narrow membranous scolex-like apex. Clasper strongly arched at base, finger-like, tapered apically, lacking stout bristles on inner margin.

**Female.** Similar to male except as follows: ventral bristles of fore femur not as numerous; apical fourth with 6-8 spine-like anteroventral spine-like bristles; fore tibia lacking modified bristles beneath. Terminalia (not dissected): sclerites of segment 8 narrowly separated laterally; T8 with posterior row of long bristles. T10 with stout curved bristles along inner and posterior margins.

**Geographical Distribution and Seasonal Occurrence.** This is the first known occurrence of this genus from Indonesia. The type specimens were collected at a waterfall in middle Java (ENGEL 1931).

**Remarks:** This species was listed under *Clinocera* Meigen (unplaced to species-group) by SINCLAIR (1995), but syntypes had not been examined.

### 3.6. *Trichoclinocera fluviatilis* (Brunetti) (Figs. 5, 12, 14, 24)

*Clinocera fluviatilis* Brunetti, 1913: 34.

*Trichoclinocera fluviatilis*: SINCLAIR 1994: 1016.

*T. fluviatilis*: WAGNER et al. 2004: 25.

**Type Material Examined.** Holotype, male labelled: "Clinocera/ fluviatilis/ Brun. Typ ♂" [hand written]; "[India; Uttar Pradesh] NEAR BHOWALI./ KUMAON: 5,700 FT/ A.D. IMMS 1910/ 12th June. On stones in stream"; "Clinocera fluviatilis/ m ♂" [hand written]; "TYPE"; "1422/ HI" [terminalia partially damaged, only midlegs remain] (ZSI).

**Additional Material.** (101 specimens) CHINA: **Yunnan:** Dali, Daboping, 1900-2200 m, 7kmW Xiaguan, 16.viii.1995 (BLKU); Jingping, Taiyangzhai, 1500-1600 m, 27.v.1996 (BLKU); Pingbian, Xinxinghe, 780

m, S Pingbian, 3.iii.1995 (BLKU). INDIA: **Himachal Pradesh:** Punj-pul Nullah, Dalhousie, 6500', 8.v.1927 (BMNH). NEPAL: Chiliwa, 1350 m, 27° 29'N, 87° 47'E, Shibku, 2100m, 27° 30'N, 87° 41'E, 7.vi.1972 (BLKU); Handhurung, 800 m, 27° 23'N, 87° 40'E, Linba, 1200 m, 27° 24'N, 87° 38'E, 27.vi.1972 (BLKU); Jilikipthi, 1850 m, 27° 09'N, 87° 30'E, Pontak, 1800 m, 27° 13'N, 87° 33'E, 13.v.1972 (BLKU); Kathmandu, Godavari, 6000', 22.vii.1967 (CNC); Lelep, 1770 m, 27° 31'N, 87° 47'E, 1-4.vi.1972 (BLKU); Lelep, 1770 m, 27° 31'N, 87° 47'E, Chiliwa, 1350 m, 27° 29'N, 87° 47'E, 7.vi.1972 (BLKU); Methirum, 1000 m, 27° 24'N, 87° 42'E, Tiwa, 1400 m, 27° 29'N, 87° 46'E, 29.v.1972 (BLKU); Naudhara - Bhadaue, nr. Pokhara, 1400-1600 m, 9.xi.1971 (BLKU); Shibku, 2100 m, 27° 30'N, 87° 41'E, Shawa, 2300 m, 27° 29'N, 87° 39'E, 8.vi.1972 (BLKU); Siwapuri, 1640 m, 22.v.1981 (BLKU). Several specimens deposited in ZFMK.

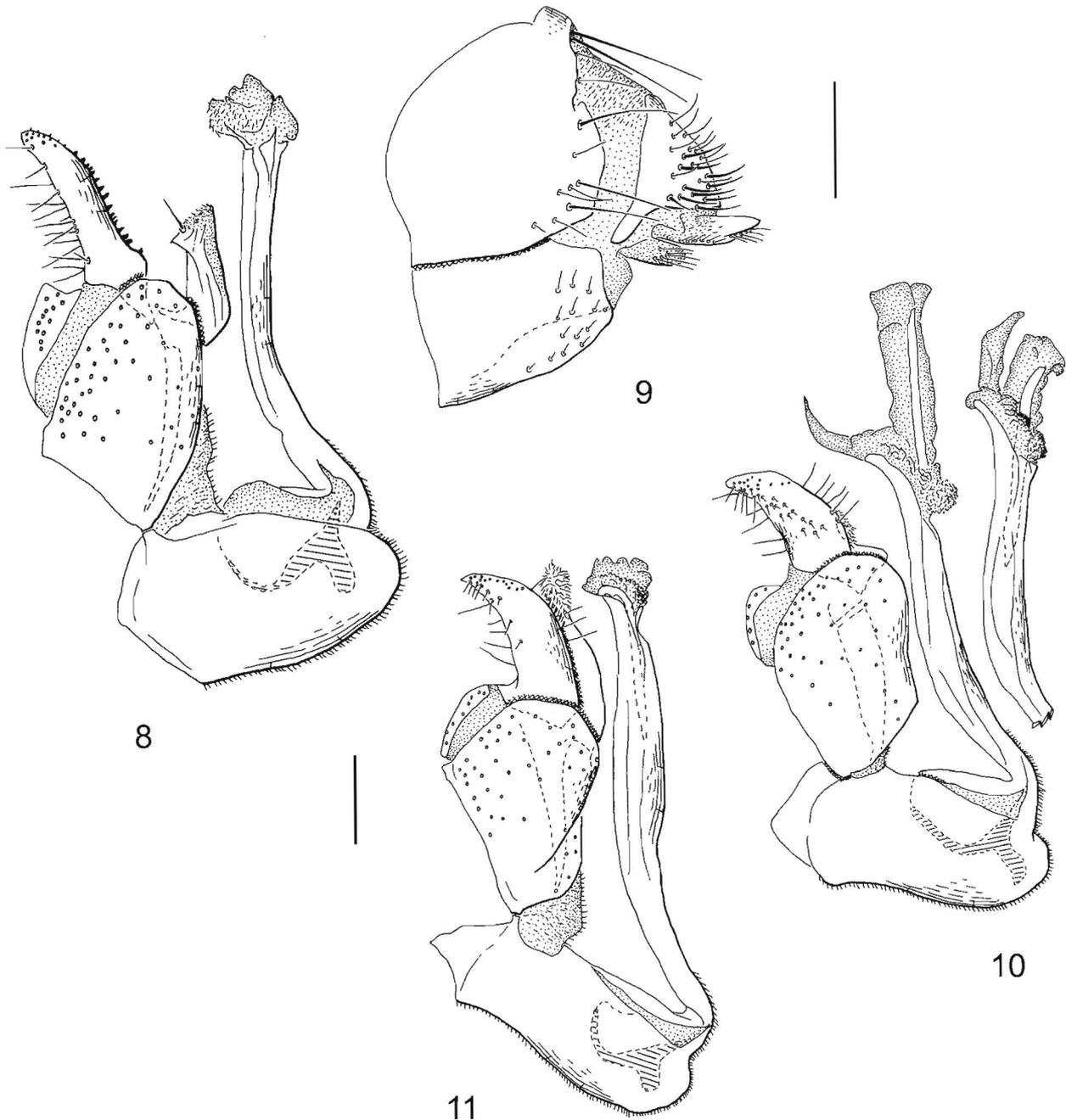
**Recognition.** This species is distinguished from other species of the *T. dasyscutellum* group by its blue pruinescence and relatively straight clasper.

**Description.** Wing length 3.6-4.3 mm.

**Male.** Dark brown with bright blue pruinescence. Head rounded; compound eye large, rounded. Face narrowest at middle, ca. width of antennal sockets, with bright blue pruinescence, lower margin of face nearly straight, lacking pronounced carina or notch; width of gena one-sixth height of eye. Anterior margin of ocellar triangle pale brown, lower postociput and gena with blue pruinescence; vertex and upper part of postociput dark when viewed dorsally. Ocellar bristles longest among cranial bristles; occiput with 3 pairs of bristles posterior to ocellar triangle; postocular with row of short bristles along margin of eye, upper 3-4 bristles dark, stouter than lower bristles. Arista-like stylus long and slender, slightly tapered apically. Palpus somewhat clavate, length less than one-half height of eye.

Pleura, postpronotal lobe, notopleuron entirely clothed in bright blue pruinescence; posterolateral corner of scutum including postalar ridge pale brown. Thoracic bristles short, shorter than one-half width of eye; acr lacking; 5 pairs slender dc; 1 slender pprn; 1 presut spal; 2 stout npl; 2 psut spal; 1 very short, slender pal; 2 pairs sctl and several dark marginal setulae; several pale setulae on notopleural depression. Laterotergite with patch of pale bristles; prothoracic episternum with pale hairs; katapisternum and hind margins of metepisternum lacking hairs.

Wing (Fig. 14) narrow, infusate; narrow, faint, elliptical, stigma present. One basal costal bristle, nearly twice length of posterior dc. Row of setulae from base of R to tip of R<sub>1</sub>; cell dm strongly produced apically; R<sub>4</sub>



**Figs. 8-11:** Terminalia of *Trichoclinocera dasyscutellum* group. (8) *T. nepalensis* sp. nov., male; (9) *T. taiwanensis* sp. nov., female; (10) *T. taiwanensis* sp. nov., male with phallus partially and totally extended; (11) *T. yunnana* sp. nov., male with inner apical rod retracted. Scale bar = 0.1 mm.

and R<sub>5</sub> somewhat divergent apically. Halter knob dark with pale shaft.

Legs entirely dark; coxae with bright blue pruinescence. Coxae with long golden marginal hairs. Fore femur with 1 black, spur-like anteroventral bristle on apical fifth (Fig. 24); lacking anterior bristles on apical third, dorsal to spine-like bristles; anteroventral row of short, pale bristles, shorter than one-third width of femur; pos-

teroventral row of slender, pale bristles longer than anteroventral bristles, with 1 basal bristle longer than width of femur; anterodorsal region lacking row of stout bristles on basal third. Fore tibia with biserial row of short stout bristles beneath. Mid femur with 1 black, spur-like anteroventral preapical bristle, slightly shorter than width of femur, similar in size to anteroventral bristle of fore femur; lacking erect antero- and postero-dorsal bristles. Hind femur with 1 anteroventral preapi-

cal bristle, subequal to width of femur, much more slender than preapical bristle of mid femur; lacking antero- and posterodorsal bristles. Hind tibia lacking posterodorsal spur-like bristle near base; 2 ventral preapical bristles, longer than width of tibia. Tarsi longer than corresponding tibiae. Empodium pulvilliform, subequal in length to claw, less than one-half length of tarsomere.

Hypandrium (Fig. 5) cylindrical, broad, longer than epandrium. Phallus short, strongly curved sub-basally; anterior margin of apex slightly curved, lacking membranous sac; posterior margin of apex with rounded, membranous lobes; ejaculatory apodeme sharply recurved anteriorly. Surstylus sharply produced posteriorly, gun-shaped, with membranous oval scolex-like apex. Claspings cercus straight, projected obliquely, finger-like, strongly tapered to narrow apex, bearing stout anteroventral bristles on outer face; inner margin with long bristles, lacking peg-like bristles.

**Female.** Similar to male except as follows: fore femur with 2-3 spur-like bristles, apical 2 bristles subequal to width of femur; biserial row of bristles beneath not as dense and distinctive as male; fore tibia lacking modified bristles beneath. Terminalia very similar to *T. taiwanensis*: sclerites of segment 8 overlap laterally; T8 with sparse posterior row of long and short bristles, dorsal bristles nearly subequal to length of sclerite; T10 with stout, curved bristles on apical two-thirds, with apical bristles more stout than remaining bristles; anteroventral corner of T10 narrowed and prolonged obliquely.

#### Geographical Distribution and Seasonal Occurrence.

This species ranges from Northern India and Nepal, eastward to Yunnan (Fig. 12). In Nepal it ranges from 1000-2000 m, sympatric with *T. nepalensis*.

#### 3.7. *Trichoclinocera naumanni* sp. nov. (Figs. 6, 12)

**Type Material.** Holotype, male labelled: "[CHINA: Sichuan]/ Maziba, 1100-/ 1300 m, Emeishan/ Aug. 16, 1998/ T. SAIGUSA col." (BLKU).

Paratypes: CHINA: **Sichuan:** 4 ♂, 8 ♀, same data as holotype (BLKU, ZFMK).

**Recognition.** Distinguished by its brownish integument, especially the pale brown coxae and arched and strongly tapered claspings cercus.

**Description.** Wing length 3.6-4.0 mm.

**Male.** Dark brown with brownish-orange markings and faint blue pruinescence. Head rounded; compound eye large, rounded. Face narrowest at middle, ca. width of antennal sockets, with pale whitish pruinescence on lower third; lower margin of face with slight cleft with

small carina or swelling; width of gena one-sixth height of eye. Vertex and ocellar triangle dark brown, lower postocciput and gena slightly pruinescent. Ocellar bristles longest among cranial bristles; occiput with 3 pairs of bristles posterior to ocellar triangle; postocular with row of short bristles along margin of eye, upper 3-4 bristles dark, stouter than lower bristles. Arista-like stylus long and slender, not tapered apically. Palpus somewhat clavate, length less than one-third height of eye.

Pleura brown with pale areas along sutures, with tinge of pale blue pruinescence when viewed from above; postpronotal lobe, notopleuron, posterior half of anepimeron pale brown and posterolateral corner of scutum including postalar ridge pale brown. Thoracic bristles short, less than one-half width of eye; acr lacking; 5 pairs slender dc; 1 slender short ppm, one-third to one-half length of dc; 1 presut spal; 2 stout npl; 2 psut spal; 1 very short, slender pal; 2 pairs sctl and several pale setulae laterally; several pale setulae on notopleural depression. Laterotergite with small patch of dark bristles; prothoracic episternum with pale hairs; katepisternum and hind margins of metepisternum lacking hairs or very scarce.

Wing narrow, infuscate; narrow, faint, elliptical, stigma present. One basal costal bristle, nearly twice length of posterior dc. Row of setulae from base of R to tip of R<sub>1</sub>; cell dm produced apically; R<sub>4</sub> and R<sub>5</sub> divergent. Halter knob dark with pale shaft.

Legs dark brown, except inner base of mid femur and base of hind femur pale; coxae brownish orange, darker on anterior margin of fore coxa; lacking blue pruinescence. Coxae with long dark marginal hairs. Fore femur with 2 black, spur-like anteroventral subapical bristles; lacking anterior bristles on apical third, dorsal to spine-like bristles; anteroventral row of short, pale bristles, ca. one-half width of femur; posteroventral row of slender, pale bristles with basal bristles nearly subequal to width of femur, with 1 basal bristle twice width of femur. Fore tibia with biserial row of short, stout bristles beneath. Mid femur with 1 black, spur-like anteroventral preapical bristle, subequal to width of femur, similar in size to anteroventral bristles of fore femur; lacking erect antero- and posterodorsal bristles. Hind femur with 1 slender anteroventral preapical bristle, subequal to width of femur, much more slender than preapical bristle of mid femur; lacking antero- and posterodorsal bristles. Hind tibia lacking posterodorsal spur-like bristle near base; 2 ventral erect bristles, longer than width of tibia on apical fifth; 1-2 erect, preapical dorsal bristles. Tarsi longer than corresponding tibiae. Empodium pulvilliform, subequal in length to claw, ca. one-half length of tarsomere.

Hypandrium (Fig. 6) cylindrical, distinctly longer than epandrium; anterior margin produced into broad apodeme. Phallus not extending beyond claspings cercus;

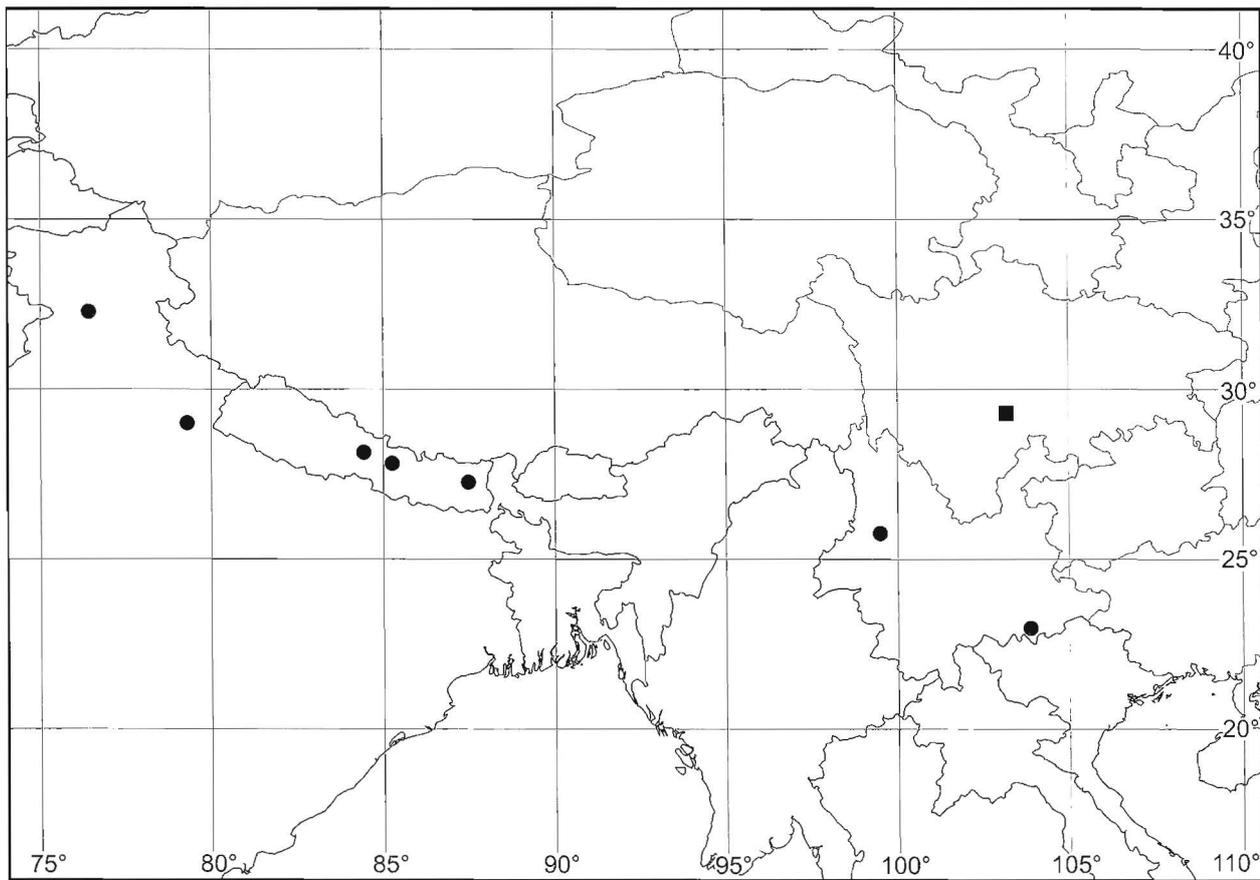


Fig. 12: Known distribution of species of *Trichoclinocera dasyscutellum* group. *T. fluviatilis* (Brunetti) (●), *T. naumanni* sp. nov. (■).

somewhat curved sub-basally; anterior margin of apex curved, with short membranous sac; posterior margin of apex with rounded pair of lobes, clothed in microtrichia; long, straight rod with membranous sheath projected apically, nearly one-third length of phallic shaft, often partially or completely retracted within shaft of phallus; ejaculatory apodeme arched strongly anteriorly. Surstylus slender, subequal in length to clasping cercus with angular base, partially arched subapically, with membranous cylindrical scolex-like apex. Clasping cercus strongly curved, claw-like, strongly tapered to narrow apex, bearing short bristles on outer face, concentrated near apex; inner margin with short slender bristles.

**Female.** Similar to male except as follows: fore femur with 3-4 preapical, anteroventral spur-like bristles; biserial row of bristles beneath not as dense and distinctive as male; fore tibia lacking modified bristles beneath. Terminalia similar to *T. taiwanensis*.

**Geographical Distribution and Seasonal Occurrence.** This species is currently known only from the Sichuan Province of China (Fig. 12).

**Remarks.** This species is most closely related to *T. yunnana*, on the basis of their very similarly shaped

clasping cercus and configuration of the membranous apex of the phallus.

**Etymology.** The specific name honours the late Dr. Clas M. NAUMANN, in recognition of his dedication to entomology, systematics and Museum Koenig.

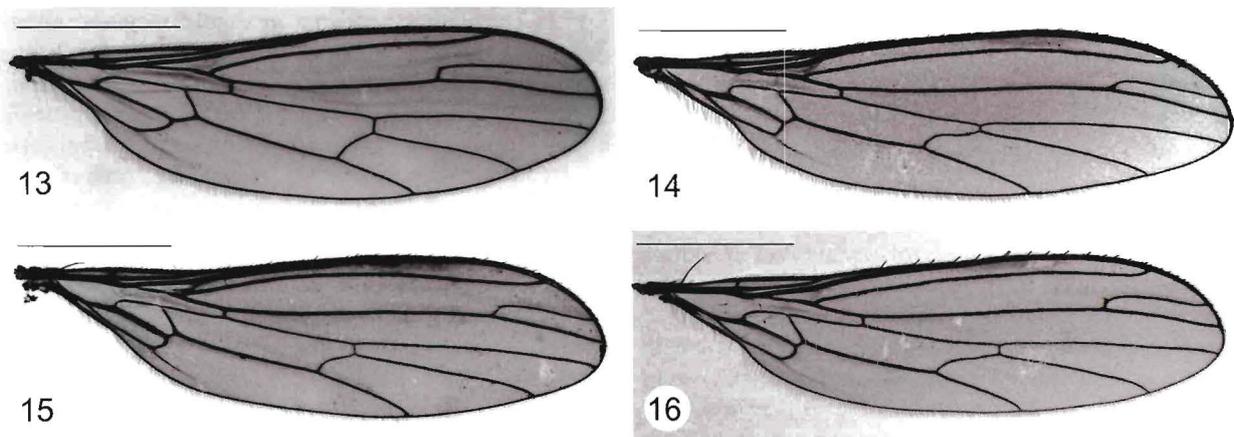
### 3.8. *Trichoclinocera nepalensis* sp. nov.

(Figs. 8, 15, 17, 25)

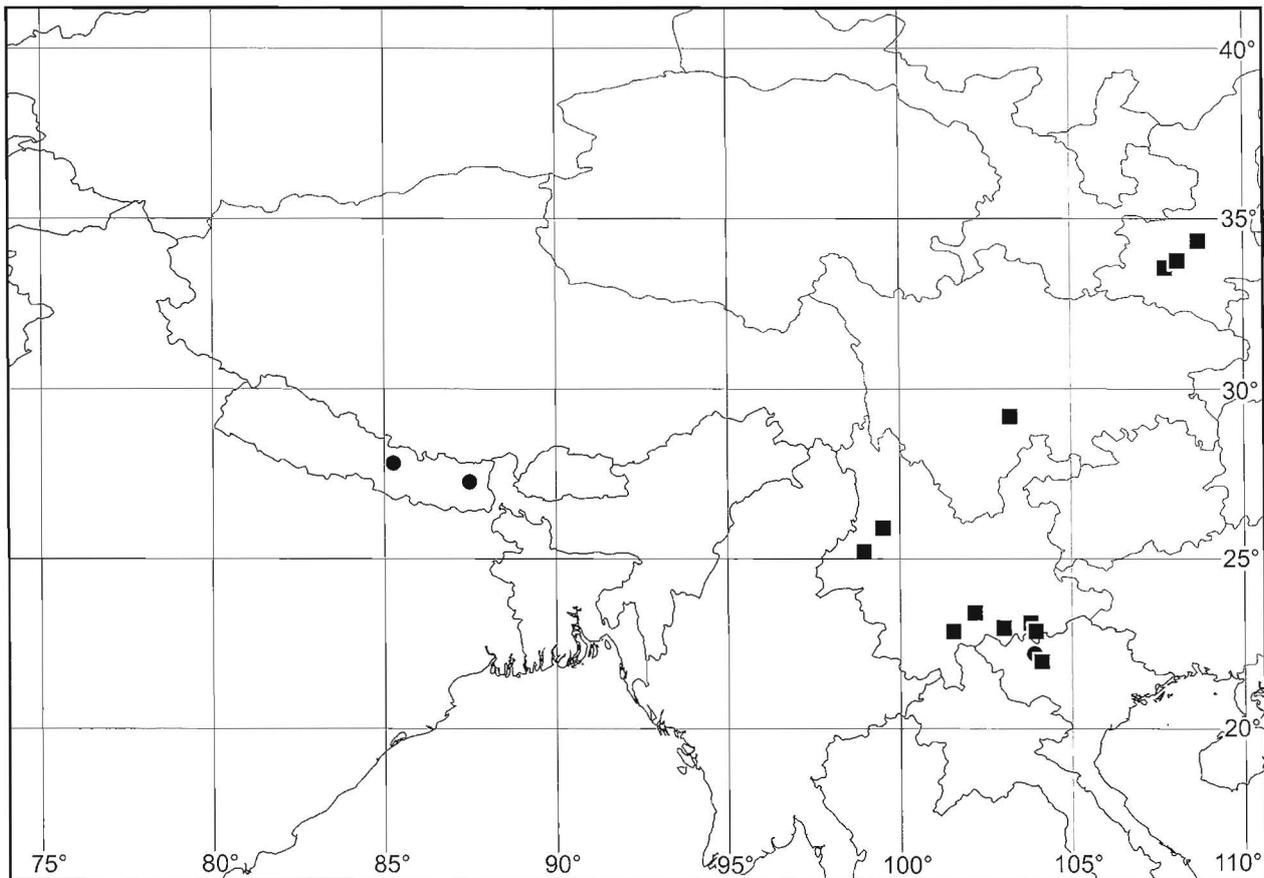
**Type Material.** Holotype, male labelled: "NEPAL, Ktmnd./ Godavari 6000'/ 18 July 1967/ Can. Nepal Exped." (CNC).

Paratypes: NEPAL: 10 ♂, 5 ♀, same data as holotype (CNC); 8 ♂, 14 ♀, 22.vii.1967, same locality as holotype (CNC); 5 ♂, 17 ♀, Lelep, 1770 m, 27° 31'N, 87° 47'E, 1-4.vi.1972, JE/ HS (BLKU); 1 ♀, Pulchawk, 6600', 21.vii.1967, Can. Nepal Exped. (CNC); 2 ♂, Takwa, 1500 m, 27° 31'N, 87° 48'E, Lelep, 1770 m, 27° 31'N, 87° 47'E, 1.vi.1972, HS (BLKU). VIETNAM: 12 ♂, 22 ♀, Lao Cai Prov., Sa Pa, 1600 m, 27.v.1997, RM (BLKU). Several specimens deposited in ZFMK.

**Recognition.** Distinguished from other Nepalese species by lacking distinctive blue pruinescence, straight



**Figs. 13-16:** Wings of *Trichoclinocera dasyscutellum* group. (13) *T. dasyscutellum* (Saigusa); (14) *T. fluviatilis* (Brunetti); (15) *T. nepalensis* sp. nov.; (16) *T. yunnana* sp. nov. Scale bar = 1.0 mm.



**Fig. 17:** Known distribution of species of *Trichoclinocera dasyscutellum* group. *T. nepalensis* sp. nov. (●), *T. yunnana* sp. nov. (■).

clasping cercus and surstylus bearing a stout, apical bristle.

**Description.** Wing length 3.6-4.3 mm.

**Male.** Dark brown with brownish-orange markings and faint blue pruinescence. Head rounded; compound eye large, rounded. Face narrowest at middle, ca. width of

antennal sockets, with pale whitish pruinescence on lower half; lower margin of face with slight cleft with small carina or swelling; width of gena one-sixth height of eye. Vertex and ocellar triangle dark brown, lower postocciput and gena slightly pruinescent. Ocellar bristles longest among cranial bristles; occiput with 3 pairs of bristles posterior to ocellar triangle; postocular with

row of short bristles along margin of eye, upper 3-4 bristles dark, stouter than lower bristles. Arista-like style long and slender, slightly tapered apically. Palpus somewhat clavate, length less than one-third height of eye.

Pleura brown with tinge of pale blue pruinescence; postpronotal lobe, notopleuron, posterior half of anepimeron pale brown and posterolateral corner of scutum including postalar ridge pale brown. Thoracic bristles short, less than one-half width of eye; acr lacking; 5 pairs slender dc; 1 slender short pprn, one-fourth length of dc; 1 presut spal; 2 stout npl; 2 psut spal; 1 very short, slender pal; 2 pairs sctl and several pale setulae laterally; several pale setulae on notopleural depression. Laterotergite with patch of dark bristles; prothoracic episternum with pale hairs; katapisternum and hind margins of metepisternum lacking hairs or very scarce.

Wing (Fig. 15) narrow, infuscate; narrow, faint, elliptical, stigma present. One basal costal bristle, nearly twice length of posterior dc. Row of setulae from base of R to tip of R<sub>1</sub>; cell dm produced apically; R<sub>4</sub> and R<sub>5</sub> somewhat divergent apically. Halter knob dark with pale shaft.

Legs dark brown, except inner base of hind femur pale; coxae brownish orange, darker on anterior margin, especially fore coxa; lacking blue pruinescence. Coxae with long dark marginal hairs. Fore femur with 1 black, spur-like anteroventral subapical bristle (Fig. 25); lacking anterior bristles on apical third, dorsal to spine-like bristles; anteroventral row of short, pale bristles, ca. one-half width of femur, with 1 basal bristle nearly twice width of femur; posteroventral row of slender, pale bristles similar to anteroventral bristles, with 1 basal bristle twice width of femur; anterodorsal region with row of very short, reduced bristles on basal third. Fore tibia with biserial row of short stout bristles beneath. Mid femur with 1 black, spur-like anteroventral preapical bristle, subequal to width of femur, similar in size to anteroventral bristle of fore femur; lacking erect antero- and posterodorsal bristles. Hind femur with 1 slender anteroventral preapical bristle, shorter than width of femur, much more slender than preapical bristle of mid femur; lacking antero- and posterodorsal bristles. Hind tibia lacking posterodorsal spur-like bristle near base; 2 ventral erect bristles, longer than width of tibia on apical fifth; 1 erect, preapical dorsal bristle. Tarsi longer than corresponding tibiae. Empodium pulvilliform, subequal in length to claw, ca. one-half length of tarsomere.

Hypandrium (Fig. 8) oval, more broad anteriorly, slightly longer than epandrium. Phallus short, shallowly curved sub-basally; anterior margin of apex curved, with short membranous lobe clothed in microtrichia; posterior margin of apex with rounded membranous

lobes; ejaculatory apodeme gradually recurved anteriorly. Surstylus ca. one-half length of claspings cercus, sharply produced anteroapically, with membranous posterior and apical margin clothed with short microtrichia; apex bearing long bristle mounted on cylindrical process. Claspings cercus straight, finger-like, gradually tapered to rounded apex, bearing slender anteroventral bristles on outer face; inner margin with short, stout, peg-like bristles.

**Female.** Similar to male except as follows: fore femur with 0-3 stout anteroventral bristles basal to preapical spine-like bristle; biserial row of bristles beneath not as dense and distinctive as male; fore tibia lacking modified bristles beneath. Terminalia very similar to *T. taiwanensis*: sclerites of segment 8 partially overlap laterally; T8 with sparse posterior row of long and short bristles, dorsal bristles nearly subequal to length of sclerite; T10 with stout, curved bristles on apical two-thirds, with apical bristles more stout than remaining bristles; anteroventral corner of T10 narrowed and prolonged obliquely.

#### Geographical Distribution and Seasonal Occurrence.

This species is known from Nepal and northern Vietnam (Fig. 17) and is sympatric with *T. fluviatilis* in Nepal and *T. yunnana* in Vietnam.

**Remarks.** The claspings cercus of the Vietnam population is more straight compared to the Nepalese population which is slightly arched apically.

**Etymology.** The specific name refers to the type locality and where the majority of the specimens were collected.

#### 3.9. *Trichoclinocera taiwanensis* sp. nov.

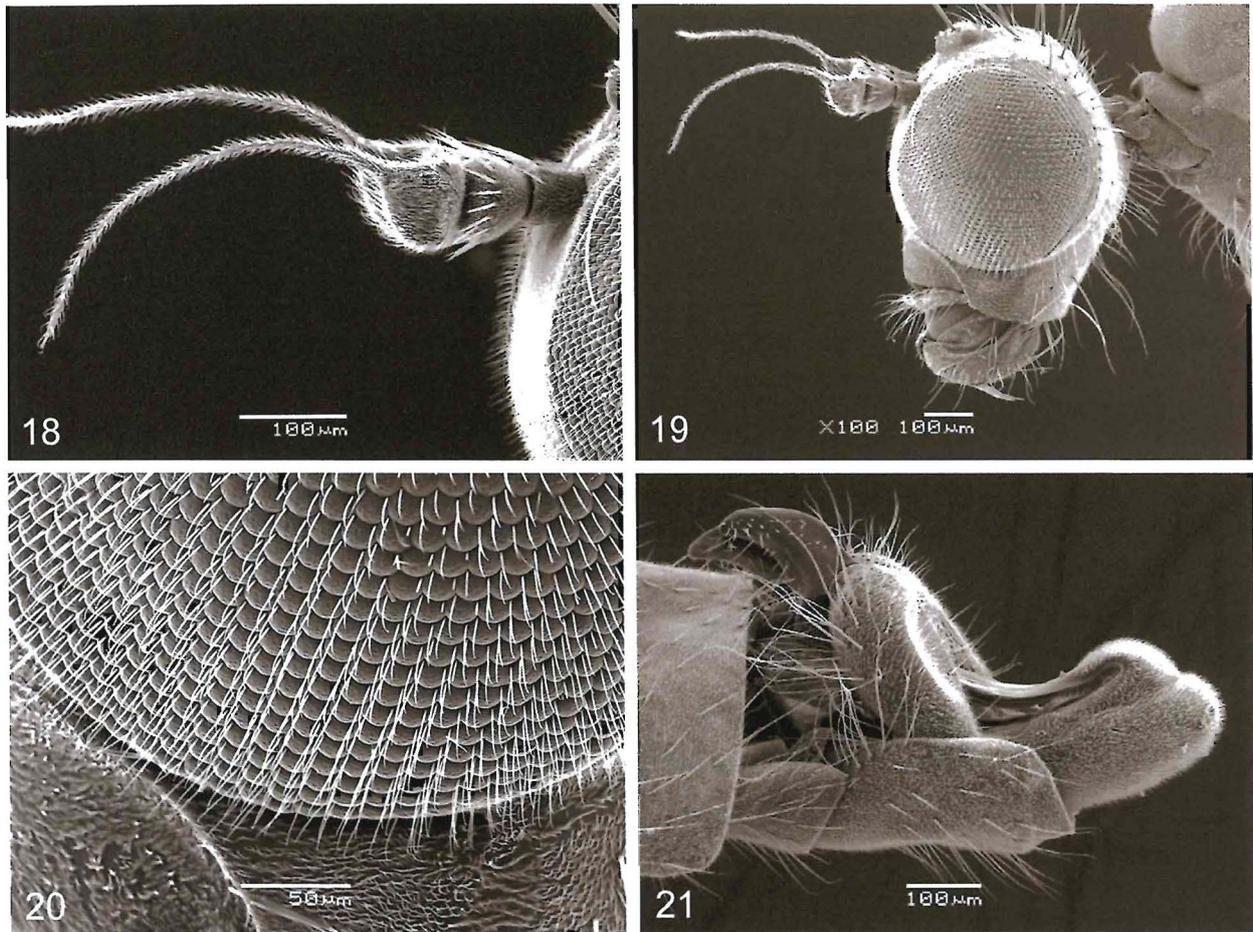
(Figs. 7, 9, 10, 21, 26)

**Type Material.** Holotype male labelled: "(Taiwan)/ Wulai/ Taipei Hsien"; "17.iv.1965/ T. Saigusa" (BLKU).

Paratypes: TAIWAN: **Chiayi-hs.**: 2 ♂, Chiaoliping, 14.iv.1965, TS (BLKU). **Nantou-hs.**: 3 ♀, Tungyenchi, 950 m, Meichi, Jenai-hsiang, 19.xi.1997, BJS (CNC). **Taichung-hs.**: 32 ♂, 37 ♀, Suchilanchi, 1600 m, Huan-shan, nr. Lishan, 24-25.xi.1997, river, BJS (ZFMK). **Taipei-hs.**: 26 ♂, 16 ♀, same data as holotype (BLKU); 1 ♂, 1 ♀, Wulai, 31.iii.1984, K. Ohara (BLKU); 16 ♂, 32 ♀, Fushan, Wulai-hsiang, 400-600 m, 28.xi.1997, river, BJS (CNC, ZFMK); 1 ♂, 2 ♀, Han Hsien, Fushan, LTER Site, small river No. 8, 27.iii.2003, L. Papp (HNHM).

**Recognition.** This species is readily distinguished by the slender pointed anteroapical lobe of the phallus and dull coloured stalks of the halteres.

**Description.** Wing length 4.5-5 mm.



**Figs. 18-21:** Scanning electron photographs of *Trichoclinocera* spp. (18) *T. dasyscutellum* (Saigusa), antennae; (19) *T. dasyscutellum* (Saigusa), compound eye; (20) *T. dasyscutellum* (Saigusa), compound eye and ommatrichia; (21) *T. taiwanensis* sp. nov., male terminalia, lateral view.

**Male.** Dark brown with distinct blue pruinescence. Head rounded; compound eye large, rounded. Face narrowest at middle, ca. width of antennal sockets, with distinct blue pruinescence, lower margin of face nearly straight, lacking pronounced carina or notch; width of gena one-sixth height of eye. Ocellar bristles longest among cranial bristles; occiput with 3 pairs of bristles posterior to ocellar triangle; postocular with row of short bristles along margin of eye, bristles of upper half to third of eye dark, stouter than lower bristles. Arista-like stylus long and slender, slightly tapered apically. Palpus somewhat clavate, length less than one-half height of eye.

Pleura, postpronotal lobe and notopleuron entirely clothed in bright blue pruinescence; posterolateral corner of scutum including postalar ridge pale blue. Thoracic bristles short, nearly one-half width of eye; acr lacking; 5 pairs dc; 1 pprn; 1 presut spal; 2 npl; 2 psut spal; 1 very short, slender pal; 2 pairs sctl and numerous dark setulae on disc; several pale bristles on notopleural depression. Laterotergite with patch of pale bristles;

prothoracic episternum, katepisternum, and hind margins of metepisternum with pale hairs.

Wing narrow, infusate; narrow, faint, parallel-sided stigma present. One short, basal costal bristle, subequal to length of posterior dc. Row of setulae from base of R to tip of R<sub>1</sub>; cell dm strongly produced apically; R<sub>4</sub> and R<sub>5</sub> parallel-sided. Halter dark with dull base, not brightly coloured.

Legs dark; coxae with pale blue pruinescence. Coxae with long golden marginal hairs. Fore femur with 3-4 black, spur-like anteroventral bristles on apical fourth (Fig. 26); lacking anterior bristles on apical third, dorsal to spine-like bristles; anteroventral biserial row of short bristles, shorter than half width of femur; posteroventral row of slender bristles subequal to one-half width of femur, 2-3 basal bristles subequal to width of femur; anterodorsal region lacking row of stout bristles on basal third. Fore tibia with biserial row of short, stout bristles beneath. Mid femur with 1 black, spine-like anteroventral preapical bristle, shorter than width of femur, simi-

lar to fore femur; lacking erect antero- and posterodorsal bristles. Hind femur with 1 anteroventral preapical bristle, subequal to width of femur, more slender than preapical bristle of mid femur; lacking antero- and posterodorsal bristles. Hind tibia lacking posterodorsal spur-like bristle near base; 2 ventral and 2 dorsal preapical bristles, longer than width of tibia. Tarsi longer than corresponding tibiae. Empodium pulvilliform, subequal in length to claw, less than one-half length of tarsomere.

Hypandrium (Figs. 10, 21) cylindrical, only slightly longer than epandrium. Phallus short, curved subbasally; anterior margin of apex curved, produced into curved, blade-like, membranous tapered sac; posterior margin of apex with rounded pair of roughened lobes, and long, straight rod with membranous sheath projected apically, nearly one-third length of phallic shaft; ejaculatory apodeme straight anteriorly. Surstylus slender, distinctly bent, twisted and arched medially, with membranous oval scolex-like apex. Claspings cercus curved, finger-like, strongly tapered to narrow apex, bearing rows of short bristles on outer face; inner margin with long silky bristles, subequal to width of lobe.

**Female.** Similar to male except as follows: fore femur with 5-6 spur-like bristles, increasing in length apically, with stout, short bristles intermixed in anteroventral row; fore tibia lacking modified bristles beneath. Terminalia (Fig. 9): sclerites of segment 8 overlap laterally; T8 with sparse posterior row of long and short bristles, dorsal bristles subequal to length of sclerite; T10 with stout, curved bristles on apical two-thirds, with apical bristles more stout than remaining bristles; anteroventral corner of T10 narrowed and prolonged obliquely.

**Geographical Distribution and Seasonal Occurrence.** This species is restricted to Taiwan (Fig. 7).

**Remarks.** The apex of the phallus was often found retracted (Fig. 10), where the long apical rod is withdrawn in the shaft of the phallus and the blade-like sac is also not fully inflated. This retractable rod is present in *T. fluviatilis*, *T. naumanni*, *T. yunnana* and possibly also *T. feuerborni*. This structure is unique to this subgroup and supports there close phylogenetic relationship.

**Etymology.** The specific name refers to its geographic distribution.

### 3.10. *Trichoclinocera yunnana* sp. nov. (Figs. 11, 16, 17, 27)

**Type Material.** Holotype, male labelled: "[CHINA: YUNNAN]/ Huanglianshan/ 1800m, nr. Sanmeng/ Luchun, 9 Mar.1995/ T. SAIGUSA col." (BLKU).

Paratypes: CHINA: **Shaanxi:** 1 ♂, 1 ♀, Fuping-x, Lianfengya, 2000-2100 m, 12 kmWNW, Longcaoping,

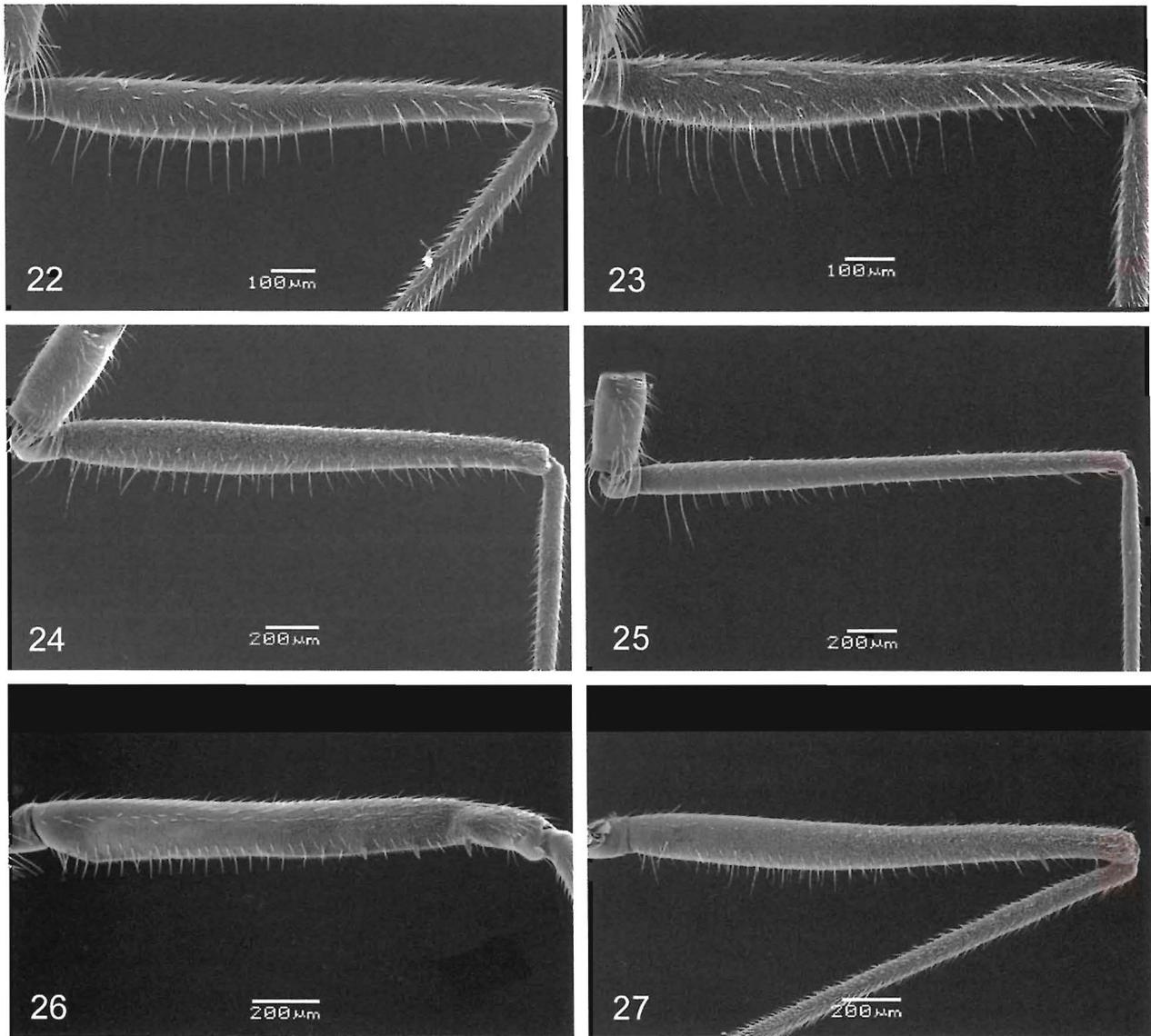
24.vi.1997, TS (BLKU); 6 ♂, 14 ♀, Fuping-x, nr. Longcao, 1310-1400 m, 8 kmN Longcaoping, 27.vi.1997, TS (BLKU); 8 ♂, 3 ♀, Fuping-x, Xigou, 1340-1400 m, 5 kmNW Longcaoping, 27.vi.1997, TS (BLKU); 1 ♂, 1 ♀, Zhouzhi-x, Shuimoping, 1500 m, SSW Banfangzi, 3.vii.1997, TS (BLKU). **Sichuan:** 5 ♂, 10 ♀, Jingshui, 700-750 m, Emeishan, 7.viii.1998, TS (BLKU); 1 ♀, Maziba, 1100-1300 m, Emeishan, 16.viii.1998, TS (BLKU). 1 ♂, 4 ♀, Wuxiangang, 700 m, Emeishan, 14.viii.1998, TS (BLKU). **Yunnan:** 36 ♂, 56 ♀, same data as holotype (BLKU); 19 ♂, 32 ♀, Dali, Daboping, 1900-2200 m, 7 kmW Xianguan, 16.viii.1996, TS (BLKU); 2 ♂, Hekou, 3 km from Laofanzha, 200 m, 1.iii.1995, TS (BLKU); 5 ♂, 1 ♀, Hekou, Nanxi-Quiatou, 200 m, 37 km from Hekou, 28.ii.1995, TS (BLKU); 2 ♂, 1 ♀, Nanxi-Quiatou, 150 m, 27 km from Hekou, 26.ii.1995, TS (BLKU); 42 ♂, 52 ♀, Jingcheng, 28 km from Jiangcheng, 1125 m, 12.iii.1995, TS (BLKU); 1 ♀, Jingping, Fenshuiling Nat. Res. 1850 m, 25.v.1996, TS (BLKU); 2 ♂, 2 ♀, Pingbian, Xinxinghe, 780 m, S. Pingbian, 3.iii.1995, TS (BLKU); 1 ♂, 5 ♀, Yongping, Meihuapu, 2300 m, 83 km from Xiaguan, 4.vi.1996, TS (BLKU). **VIETNAM:** 1 ♂, 1 ♀, Lao Cai Prov., Sa Pa, 1700 m, 26.v.1997, RM (BLKU); 5 ♂, 12 ♀, Lao Cai Prov., Sa Pa, 1600 m, 27.v.1997, RM (BLKU). Several specimens deposited in ZFMK.

**Recognition.** This species is distinguished by the orange-brown coloured stalks of the halteres and the strongly arched and tapered claspings cercus.

**Description.** Wing length 4.3-5.4 mm.

**Male.** Dark brown with distinct blue pruinescence. Head rounded; compound eye large, rounded. Face narrowest at middle, ca. width of antennal sockets, with distinct blue pruinescence, lower margin of face nearly straight with slight notch; width of gena one-fifth height of eye. Ocellar bristles longest among cranial bristles; occiput with 3 pairs of bristles posterior to ocellar triangle; postocular with row of short bristles along margin of eye, bristles of upper third of eye dark, stouter than lower bristles. Arista-like stylus long and slender, tapered apically. Palpus somewhat clavate, length ca. one-third half height of eye.

Pleura, postpronotal lobe and notopleuron entirely clothed in bright blue pruinescence; posterolateral corner of scutum including postalar ridge pale brown. Thoracic bristles short, less than one-half width of eye; acr lacking; 5 pairs dc; 1 ppm; 1 presut spal; 2 npl; 2 psut spal; 1 very short, slender pal; 2 pairs sctl and numerous pale setulae on disc and margin; several pale bristles on notopleural depression. Laterotergite with patch of long, dark bristles; prothoracic episternum with pale hairs; katepisternum and hind margins of metepisternum lacking hairs.



**Figs. 22-27:** Scanning electron photographs of male forelegs of *Trichoclinocera* spp., lateral view. (22) *T. asiatica* sp. nov.; (23) *T. dasyscutellum* (Saigusa); (24) *T. fluviatilis* (Brunetti); (25) *T. nepalensis* sp. nov.; (26) *T. taiwanensis* sp. nov.; (27) *T. yunnana* sp. nov.

Wing (Fig. 16) narrow, infusate; narrow, faint, parallel-sided stigma present. One short, basal costal bristle, longer than length of posterior dc. Row of setulae from base of R to tip of R<sub>1</sub>; cell dm strongly produced apically; R<sub>4</sub> and R<sub>5</sub> parallel-sided, except at extreme apex. Halter dark with pale base.

Legs dark, except inner base of hind femur paler; coxae brownish orange, darker on anterior margin, especially fore coxa; some specimens with blue pruinescence. Coxae with long, golden marginal hairs. Fore femur with 1 black, spur-like anteroventral preapical bristle (Fig. 27); lacking anterior bristles on apical third, dorsal to spine-like bristles; anteroventral row of slender bristles, one-half to one-third width of femur; posteroventral row of slender bristles similar to anteroventral row,

basal bristles only slightly longer than preceding bristles; anterodorsal region lacking row of stout bristles on basal third. Fore tibia with biserial row of slender bristles beneath, one-half width of tibia. Mid femur with 1 black, spine-like anteroventral preapical bristle, subequal to width of femur, similar to fore femur; lacking antero- and posterodorsal bristles. Hind femur with 1 anteroventral preapical bristle, subequal to width of femur, more slender than preapical bristle of mid femur; lacking antero- and posterodorsal bristles. Hind tibia lacking posterodorsal spur-like bristle near base; 2 ventral and 2 dorsal, erect preapical bristles, longer than width of tibia. Tarsi longer than corresponding tibiae. Empodium pulvilliform, subequal in length to claw, more than one-half length of tarsomere.

Hypandrium (Fig. 11) cylindrical, slightly longer than epandrium; anterior margin produced and pointed. Phallus not extending beyond clasping cercus; somewhat curved sub-basally; anterior margin of apex curved, with short membranous sac; posterior margin of apex with rounded pair of lobes, clothed in microtrichia; long, straight rod with membranous sheath projected apically, nearly one-third length of phallic shaft, often partially or completely retracted within shaft of phallus; ejaculatory apodeme gradually arched anteriorly. Surstylus slender, subequal to length of clasping cercus, partially arched subapically, with membranous oval scolex-like apex. Clasping cercus strongly curved, claw-like, strongly tapered to narrow apex, bearing short bristles on outer face, concentrated near apex; inner margin lacking stout bristles.

**Female.** Similar to male except as follows: fore femur with 2-6 spine-like bristles, increasing in length apically with bristles of posteroventral margin increasing in length basally; fore tibia lacking modified bristles beneath. Terminalia very similar to *T. taiwanensis*: sclerites of segment 8 partially overlap laterally; T8 with posterior row of long and short bristles, dorsal bristles more dense and nearly subequal to length of sclerite; T10 with stout, curved bristles on apical two-thirds, with apical bristles more stout than remaining bristles; anteroventral corner of T10 narrowed and prolonged obliquely.

#### Geographical Distribution and Seasonal Occurrence.

This species is known from Shaanxi, Yunnan and Sichuan Provinces of China and northern Vietnam (Fig. 17).

**Remarks.** The population from Shaanxi Province bears stouter bristles on the clasping cercus and the base of the surstylus is more distinctly elbowed.

**Etymology.** The specific name refers to the region where the majority of specimens were collected, including the type locality.

#### 3.11. *Trichoclinocera* sp.

**Material examined.** THAILAND: 1 ♀, S. Banna, Nakhon, 108 m, 5-10.v.1958, T.C. MAA (BPBM).

**Diagnosis.** Coxae and base of hind femur orange-brown, bearing golden bristles. Fore femur with 2 anteroventral spine-like bristles; single, dorsal spur-like seta at base of hind femur. Radial branch very short;  $M_1$  and  $M_2$  arising from cell dm closely approximated.

**Remarks.** The limited material available of this species prevents providing a full description and formal specific name. On the basis of leg colouration, it is possibly related to *T. asiatica*.

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#### REFERENCES

- BRUNETTI, E. (1913): New Indian Empididae. Records of the Indian Museum **9**: 11-45.  
 ENGEL, E. O. (1931): XV. Empididae (Dipt.) aus Java. Archiv für Hydrobiologie, Supplement Band **8**: 486-489.  
 SAIGUSA, T. (1965): Two new species of Clinocerinae from Japan (Diptera, Empididae). Kontyû **33**(1): 53-57.  
 SINCLAIR, B. J. (1994): Revision of the Nearctic species of *Trichoclinocera* Collin (Diptera: Empididae: Clinocerinae). The Canadian Entomologist **126**: 1007-1059.  
 SINCLAIR, B. J. (1995): Generic revision of the Clinocerinae (Empididae), and description and phylogenetic relationships of the Trichopezinae, new status (Diptera: Empidoidea). The Canadian Entomologist **127**: 665-752.  
 WAGNER, R., LEESE, F. & PANESAR, A. R. (2004): Aquatic dance flies from a small Himalayan mountain stream (Diptera: Empididae: Hemerodromiinae, Trichopezinae and Clinocerinae). Bonner zoologische Beiträge **52**(1-2): 3-32.

**Authors' addresses:** Bradley J. SINCLAIR (corresponding author), Zoologisches Forschungsmuseum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany, E-mail: b.sinclair.zfmk@uni-bonn.de; Toyohi SAIGUSA, 2-7-1-402, Baikoen, Chucku, Fukuoka, 810-0035, Japan.

#### APPENDIX

##### *Clinocera velutina* (Engel)

*Kowarzia velutina* Engel, 1931: 488.

*Clinocera velutina*: SINCLAIR 1995: 693

**Type Material.** Lectotype male (here designated) labelled: "Fy 2C 9/7"; "Tjiborom-Fall/ Tjobodas. W. Java./ 9.VII.29. (Feuerborn.) [hand-written]"; "[red label, no writing]"; [dissected, micro-slide mounted beneath] (SMNS). A lectotype label "LECTOTYPE/ of Kowarzia/ velutina Engel/ des. B.J. Sinclair 2004 [red label]" has been attached to this specimen.

Paralectotype: "Wasserfall.b./ Sarangan. M. Java./ Prof. Feuerborn./ 6.VII.28 [hand-written]"; "[red label, no writing]" (1 ♀, SMNS). A yellow paralectotype label has been attached to this specimen.

**Redescription.** Wing length 3 mm.

**Male.** Face with pale blue pruinescence, except upper margin of eye; lateral margins with 2-3 fine, pale setulae; lower third of face flat; vertex, gena and posterior region of head brown. Arista-like stylus long and slender. Postocular bristles dark and stout.

Pleura with pale pruinescence present when viewed from several angles. Scutum with pair of indistinct vittae, separated by reddish-brown median stripe. Several short, pale acr scattered anterior to first dc; 5 dc; 1 ppn very slender and reduced; 2 npl, lower weak and short; 1 psut spal; 1 pal; 2 scfl. Laterotergite with patch of long, dark bristles.

Wing infuscate; stigma at apex of cell sc; 1 short basal costal seta; costal spines present.  $R_{2+3}$  and  $R_{4+5}$  straight; auxiliary crossvein between  $R_4$  and  $R_{2+3}$  absent;  $R_4$  bell-shaped; anal vein indistinct or lacking; cell dm produced apically. Halter dark.

Coxae with pale pruinescence; coxae and femora bright yellowish-brown, tibia and tarsi increasingly becoming darker. Fore coxae with pale hairs. Fore femur with antero- and posteroventral row of short stout bristles on

basal two-thirds; anterior preapical comb present; dense white ventral pile lacking. Fore tibia with row of stout bristles beneath. Mid and hind femora lacking preapical bristles. Hind tibia with dorsal and ventral erect bristles on apical third. Fifth tarsomere lacking dorsoapical extension; empodium pale brown laterally.

Terminalia slide-mounted, compressed. Hypandrium broadly triangular. Phallus somewhat straight; phallic filament long, flexible and whip-like. Claspings cercus narrow with rounded tip, with dense bristles on inner anterior face. Surstylus with pointed tip.

**Female.** Similar to male except as follows: ventral bristles of foreleg less distinct; legs darker, especially femora.

**Remarks.** The male terminalia is not redrawn as the original illustration of ENGEL (1931) is adequate and it is permanently slide mounted and pinned beneath the specimen. SINCLAIR (1995) assigned this species to the *C. lineata*-group on the basis of the form of the surstylus. The presence of facial setulae is a defining synapomorphy of *Kowarzia*, but they are also present in several Asian species, including *C. velutina* (SINCLAIR 1995).

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Autor(en)/Author(s): Sinclair Bradley J., Saigusa Toyohei

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