

RESEARCH PAPER

## Taxonomic review of Chin-wen Chen's species described in the genus *Smicromyrme* (Hymenoptera: Mutillidae)

Juriya OKAYASU

Entomological Laboratory, Faculty of Agriculture, Ehime University, Tarumi 3-5-7, Matsuyama, 790-8566 Japan;  
e-mail: mutiphiidae@gmail.com

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**Abstract.** Chin-wen Chen described 28 species and 10 subspecies of the velvet ant genus *Smicromyrme* Thomson, 1870 in his 1957 revision of the Mutillidae of China and Taiwan. Most of them were subsequently transferred to 12 genera of the tribes Smicromyrmini Bischoff, 1920 and Trogaspidiini Bischoff, 1920. Four species and one subspecies, however, are still included in *Smicromyrme*. In the present paper, type specimens of these species are surveyed. As a result, *Sinotilla serpa columnata* (Chen, 1957), comb. nov., stat. nov. (♂), *Si. spinicauda* (Chen, 1957), comb. nov. (♀), and *Si. trisepta* (Chen, 1957), comb. nov. (♂) are transferred from *Smicromyrme*. *Smicromyrme bidenticulatus* Chen, 1957 (♂♀) and *Sm. triguttatus* Mickel, 1933 (= *Sm. triguttatus latisquamula* Chen, 1957, syn. nov.) (♀) remain in *Smicromyrme*. *Smicromyrme (Erimyrme) triguttatus* is newly recorded from Vietnam and Laos, and *Mickelomyrme kuznetsovi* Lelej, 1996 is newly recorded from China.

**Key words.** Hymenoptera, Aculeata, Mutillidae, Mutillinae, new combination, new synonymy, new record, Oriental Region, Palaearctic Region

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### Introduction

Chin-wen CHEN (1957) revised the family Mutillidae of China including Taiwan and described 45 new species and 13 new subspecies. Among them, 28 species and 10 subspecies were considered as members of the genus *Smicromyrme* Thomson, 1870 at that time. Generic positions of most of Chen's *Smicromyrme* were changed during the course of the long-term revision of Asian *Smicromyrme* in the last two decades (LELEJ & YAMANE 1992; LELEJ 1995a,b, 1996a,b, 2005; LELEJ et al. 2001; ZHOU et al. 2018a). Currently, Chen's species are assigned to eight genera in the tribe Smicromyrmini Bischoff, 1920: *Andreimyrme* Lelej, 1995, *Ephucilla* Lelej, 1995, *Mickelomyrme* Lelej, 1995, *Nemka* Lelej, 1985, *Physetopoda* Schuster, 1949, *Promecilla* André, 1902, *Sinotilla* Lelej, 1995, and *Smicromyrme* Thomson, 1870, and five genera in the tribe Trogaspidiini Bischoff, 1920 sensu BROTHERS & LELEJ (2017): *Krombeinidia* Lelej, 1996, *Orientidia* Lelej, 1996, *Petersenidia* Lelej, 1992, *Taiwanomyrme* Tsuneki, 1993, and *Zavatilla* Tsuneki, 1993. Four species and one subspecies are still

retained in *Smicromyrme*: *Sm. bidenticulatus* Chen, 1957, *Sm. columnatus* Chen, 1957, *Sm. spinicauda* Chen, 1957, *Sm. triguttatus latisquamula* Chen, 1957, and *Sm. triseptus* Chen, 1957. These species and subspecies have not been taxonomically revised until now, except that *Sm. bidenticulatus* and *Sm. triguttatus latisquamula* were placed by LELEJ (1985, 1995b) in the *Smicromyrme* subgenera *Erimyrme* Lelej, 1985 and *Smicromyrme* s. str., respectively.

The aim of this paper is to revise the generic affiliations of Chen's species currently included in *Smicromyrme* through the examinations of their types and additional specimens.

### Material and methods

CHEN (1957) referred to many Chinese and Taiwanese museums, institutes and collections as material depositories: Laboratoire d'Entomologie, Musée Heude; Tsing-chao Maa's personal collection; Division of Economic Zoology, Taiwan Agricultural Research Institute; Zoological Institute, Academia Sinica; Division of Entomology,



Nanking University; Entomological Laboratory, National Taiwan University; Taiwan Sugar Experiment Station; Agricultural Experiment Station of Kaohsiung District; Taiwan Provincial College of Agriculture. However, most of Chen's material is now held in Taiwan Agricultural Research Institute, Taichung, Taiwan (TARI) and Zoological Museum, University of Copenhagen, Denmark (as a result of exchange conducted by Børge Petersen). Types examined in this study are deposited in TARI.

Redescriptions were done under Wild M3Z and Leica S8APO stereomicroscopes. Measurements were taken in duplicates based on the paratypes loaned from TARI and other specimens. Several partially focused images were combined using CombineZM software (HADLEY 2008). Terminology follows LELEJ (1985) and HUBER & SHARKEY (1993).

Male genitalia were extracted from the bodies after softening by soaking in 70% ethanol. Muscles of genitalia were removed in 10% KOH solution without heating for one to three hours, then genitalia were placed in 70% ethanol to neutralize and observe. After examination, genitalia were stored in microvials filled with glycerin and attached to the same pins as the bodies. Terminology of male genitalia follows SNODGRASS (1941).

Material examined other than types is deposited in:

- ELKU Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan;  
 EUMJ Ehime University Museum, Matsuyama, Japan;  
 NIAES National Institute for Agro-Environmental Sciences, Tsukuba, Japan;  
 NSMT National Museum of Natural History, Tsukuba, Japan;  
 SKYC Seiki Yamane Collection in Kagoshima University, Kagoshima, Japan;  
 ZIN Zoological Institute, Saint Petersburg, Russia;  
 ZMHB Museum für Naturkunde, Berlin, Germany;  
 ZMUC Zoological Museum, University of Copenhagen, Denmark.

The following specimens were examined for comparison:

*Smicromyrme yunnanensis* Lelej, 1996: **LAOS**: 1 ♀, Phou-vieng Gnai, Luang Phabang Province, 1319 m alt., N19.284470 E102.355703, 22.IV.2018, H. Yoshitomi leg. (EUMJ). **THAILAND**: 1 ♀ paratype, Fang, 12.vi.1965, Japan-U.S. Cooperative Sci. Program (NSMT); 1 ♀, Chiang Mai, 4.v.1939, C. Tongyai leg. (ZMUC); 1 ♀, Fang Horticult. Exp. Station, Chiang Mai, 550–600 m alt., 19.x.1981, Zool. Museum Copenhagen leg. (ZMUC); 2 ♀♀, Fang Horticult. Exp. Station, Chiang Mai, 550–600 m alt., 20.x.1981, Zool. Museum Copenhagen leg. (ZMUC); 1 ♀, Peninsular Botanic Garden, Thung Khai, Yan Ta Khao District, Trang Province, 3.iv.2005, T. Kurihara leg. (EUMJ).

*Sinotilla runcina* (Zavattari, 1914): **MALAYSIA**: **NEGERI SEMBILAN**: 2 ♂♂, Pasoh Forest Reserve, 26.iii–3.iv.1993, K. Konishi & K. Maeto leg. by Coarse Malaise trap of Plot 4&5 (NIAES); 1 ♂, same place, 2.–8.iv.1993, K. Konishi & K. Maeto leg. by Coarse Malaise trap of Plot 1 (NIAES); 1 ♂, same place, 3.–9.iv.1993, K. Konishi & K. Maeto leg. by Coarse Malaise trap of Plot 4 (NIAES); 1 ♂, same place, 8.–15.iv.1993, K. Konishi & K. Maeto leg. by Coarse Malaise trap of Plot 1 (NIAES); 2 ♂♂, same place, 9.–16.iv.1993, K. Konishi & K. Maeto leg. by Coarse Malaise trap of Plot 4&5 (NIAES); 1 ♂, same place, 26.xi.–3.xii.1993, K. Konishi & K. Maeto leg. by Coarse Malaise trap of Plot 3 (NIAES); 2 ♂♂, same place, 3.–10.xii.1993, K. Konishi & K. Maeto leg. by Coarse Malaise trap of Plot 6 (NIAES). **SARAWAK**: Lambir National Park, Miri, 31.viii.–3.ix.1992, Canopy Biology Program Malaise trap T0, A0036, A. S. Lelej det. 1995 (SKYC).

*Sinotilla serpa* (Zavattari, 1913): **TAIWAN**: ♂ lectotype, Dalin, Chiayi, viii.1909, Hans Sauter leg. (ZMHB); 1 ♂ (Figs 27–29), Lienhuachih, Nantou Hsien, 650 m alt., vi.1984, K. S. Lin & K. C. Chou leg. by Malaise trap (TARI); 1 ♂, same place, vii.1984, K. S. Lin & K. C. Chou leg. by Malaise trap (TARI); 1 ♂, Wanfeng Hill, Taichung, vii.1984, K. S. Lin & K. C. Chou leg. by Malaise trap (TARI).

The following abbreviations are used for morphological terms and measurements:

- LOD lateral ocellar diameter;  
 OOL ocular-ocellar distance between posterior ocellus and compound eye measured in dorsal view;  
 POL interocellar distance between posterior ocelli in dorsal view;  
 S sternum;  
 T tergum.

## Taxonomy

### Genus *Smicromyrme* Thomson, 1870

(Figs 1–12)

*Smicromyrme* Thomson, 1870: 208, ♂♀. Type species: *Mutilla rufipes* Fabricius, 1787, by monotypy.

**Remarks.** This genus includes five subgenera: *Astomyrme* Lelej, 1985, *Eremotilla* Lelej, 1985, *Erimyrme* Lelej, 1985, *Rhombotilla* Nagy, 1966, and *Smicromyrme* s. str. *Smicromyrme bidenticulatus* and *Sm. triguttatus latisquamula* are confirmed to belong to the subgenus *Erimyrme* Lelej, 1985 of *Smicromyrme*.

**Gender.** Masculine. See discussion in LELEJ & BROTHERS (2008).

### *Smicromyrme (Erimyrme) bidenticulatus* Chen, 1957

(Figs 1–2)

*Smicromyrme bidenticulata* Chen, 1957: 199, ♂. Type locality: “Tsinan [= Jinan]” (Shandong, China). Holotype: ♂ (TARI), examined.

*Smicromyrme hasanensis* Lelej, 1977a: 91, ♂♀. Type locality: “7 km E Khasan” (Primorskiy kray, Russia). Holotype: ♀ (ZIN). LELEJ (1977b: 531, ♂); LELEJ (1981: 78, ♂♀); LELEJ (1985: 239, ♂♀). Synonymized by LELEJ (1985).

*Smicromyrme (Erimyrme) bidenticulata*: LELEJ (1985: 239, ♂♀); LELEJ (2000: 615); LELEJ et al. (2001: 10, ♂♀); LELEJ (2002: 68).

*Smicromyrme (Erimyrme) bidenticulatus*: LELEJ (2017: 156).

**Type material examined.** HOLOTYPE: ♂ (Figs 1–2), Longtong, Jinan, Shandong, China, 500–700 m, collector unknown (TARI).

**Diagnosis. Male.** Frons and gena with dense, confluent punctures; vertex elevated posteriorly, with sparser punctures; anterior margin of clypeus medially notched, forming pair of teeth; mandible excised beneath with robust ventral tooth basally; mesosoma black except for pronotum, tegula, scutellum, axilla, metanotum, and mesopleuron dorsally yellowish red; tegula slightly protruding beyond trans-scutal articulation; propodeum reticulate basally with median elongate enclosed cell; metasoma black without bluish metallic luster; T1–T4 and S2–S5 posteriorly fringed with pale golden setae.

**Female.** See LELEJ (1985).

**Distribution.** Russia: Primorskiy kray (LELEJ 1977a); Mongolia (LELEJ 1977b); China: Inner Mongolia, Shandong, Jiangsu (LELEJ 1985); South Korea (LELEJ et al. 2001).

**Remarks.** The paratype could not be found in TARI. This species can be placed in *Erimyrme* based on the following





Figs 1–2. *Smicromyrme bidenticulatus* Chen, 1957, ♂, holotype. 1 – habitus, lateral view; 2 – labels.

character states: clypeus concave with a pair of preapical teeth; mandible tridentate with a developed subbasal tooth on the ventral margin. This supports the subgeneric placement by LELEJ (1985). The specific name of this species was originally given as *bidenticulata* (feminine) and corrected by LELEJ (2017).

### *Smicromyrme (Erimyrme) triguttatus* Mickel, 1933

(Figs 3–12)

*Mutilla pandora*: ZAVATTARI (1913: 31, ♀). Misidentification.

*Smicromyrme triguttata* Mickel, 1933: 421, ♀. Type locality: “Taihorin [= Dalin]” (Chiayi, Taiwan). Holotype: ♀ (ZMHB), photo examined; MICKEL (1935: 293, ♀).

*Smicromyrme triguttata triguttata*: CHEN (1957: 209), ♀; LELEJ (2005: 64).

*Smicromyrme triguttata latisquamula* Chen, 1957: 209, ♀, **syn. nov.** Type locality: “Kuling [= Gulung]” (Jiangxi, China). Holotype: ♀ (TARI), examined; LELEJ (2005: 64).

**Type material examined.** *Smicromyrme triguttatus*: HOLOTYPE (Figs 8–12): ♀, Dalin, Chiayi, Taiwan, x.1910, Hans Sauter leg. (ZMHB).

*Smicromyrme t. latisquamula*: HOLOTYPE: ♀, Gulung, Lushan, Jiangxi, China, 14.viii.1935, O. Piel leg. (TARI). PARATYPES (conspicuous with the holotype): 1 ♀, Likiatun, Shaowu, Fujian, China, 2.ix.1941, T. C. Maa leg. (TARI); 1 ♀, Dazhulan, Shaowu, Fujian, China, 25.vi.1942, T. C. Maa leg. (TARI); 1 ♀ (Figs 3–7), Dazhulan, Shaowu, Fujian, China, 1.vii.1944, T. C. Maa leg. (TARI).

*Smicromyrme t. latisquamula*: PARATYPES (not conspecific with the holotype, actually belonging to *Mickelomyrme kuznetsovi*): 2 ♀♀, Bohea Hills, Wuyishan, Fujian, 4.vii.1939, T. C. Maa leg. (TARI); 1 ♀, Bohea Hills, Wuyishan, Fujian, China, 12.ix.1939, T. C. Maa leg. (TARI); 1 ♀

(Figs 13–17), Siyingpan, Yungan, Fujian, China, 29.vi.1940, T. C. Maa leg. (TARI); 1 ♀, Shui Pei Kai, Shaowu, Fujian, China, 24.vii.1943, T. C. Maa leg. (TARI); 1 ♀, Kuhsiekieh, Shaowu, Fujian, China, 1944, T. C. Maa leg. (TARI).

*Smicromyrme t. latisquamula*: Possible paratypes not conspecific with the holotype, actually belonging to *Mickelomyrme kuznetsovi*: 1 ♀, Tungan, 4.x.1940, T. C. Maa leg. (TARI); 1 ♀, Shui Pei Kai, Shaowu, 20.–24.vii.1943, T. C. Maa leg. (TARI). These two specimens were also found but they are not labelled as paratypes. It is uncertain if these two specimens are paratypes of *Smicromyrme t. latisquamula* or not.

**Other material examined.** LAOS: 1 ♀, Lak Sao, 4.xi.2004, M. Satô leg. (EUMJ). VIETNAM: 2 ♀♀, near Bach Ma National Park, 19 km point, Thua Tien-Hue (253/BTTNVN), 16.198°N 107.860°E, 1400 m alt., 3.–6.viii.2016, Y. Komeda & T. Mita leg. by yellow pan trap (ELKU).

**Diagnosis. Female.** Frons and vertex longitudinally puncto-striate; clypeus with median longitudinal tubercle protruding beyond apical margin of clypeus; mandible edentate; F1 length equal to 1.3–1.4× F2; scutellar scale posteriorly turning into median longitudinal carina extending through propodeal face; T1 yellowish red; T2 evenly convex, with three basal spots and apical narrow complete band of dense, appressed pale golden to golden setae; lateral spots on T2 located posterior to median one.

**Male.** Unknown.

**Distribution.** China: Jiangxi, Fujian (CHEN 1957); Taiwan (MICKEL 1933); Vietnam: Thua Tien-Hue (new record); Laos: Lak Sao (new record).





Figs 3–7. *Smicromyrme triguttatus latisquamula* Chen, 1957, ♀, paratype from Dazhulan, Shaowu, 1.vii.1944. 3 – habitus, dorsal view; 4 – habitus, lateral view; 5 – face; 6 – pygidial area; 7 – labels.





Figs 8–12. *Smicromyrme triguttatus* Mickel, 1933, ♀, holotype. 8 – habitus, dorsal view; 9 – habitus, lateral view; 10 – face; 11 – pygidial area; 12 – labels.





Figs 13–17. Paratype of *Smicromyrme triguttatus latisquamula* Chen, 1957, ♀ from China, Siyingpan, Yungan, 29.vi.1940, which actually belongs to *Mickelomyrme kuznetsovi* Lelej, 1996. 13 – habitus, dorsal view; 14 – habitus, lateral view; 15 – face; 16 – pygidial area; 17 – labels.



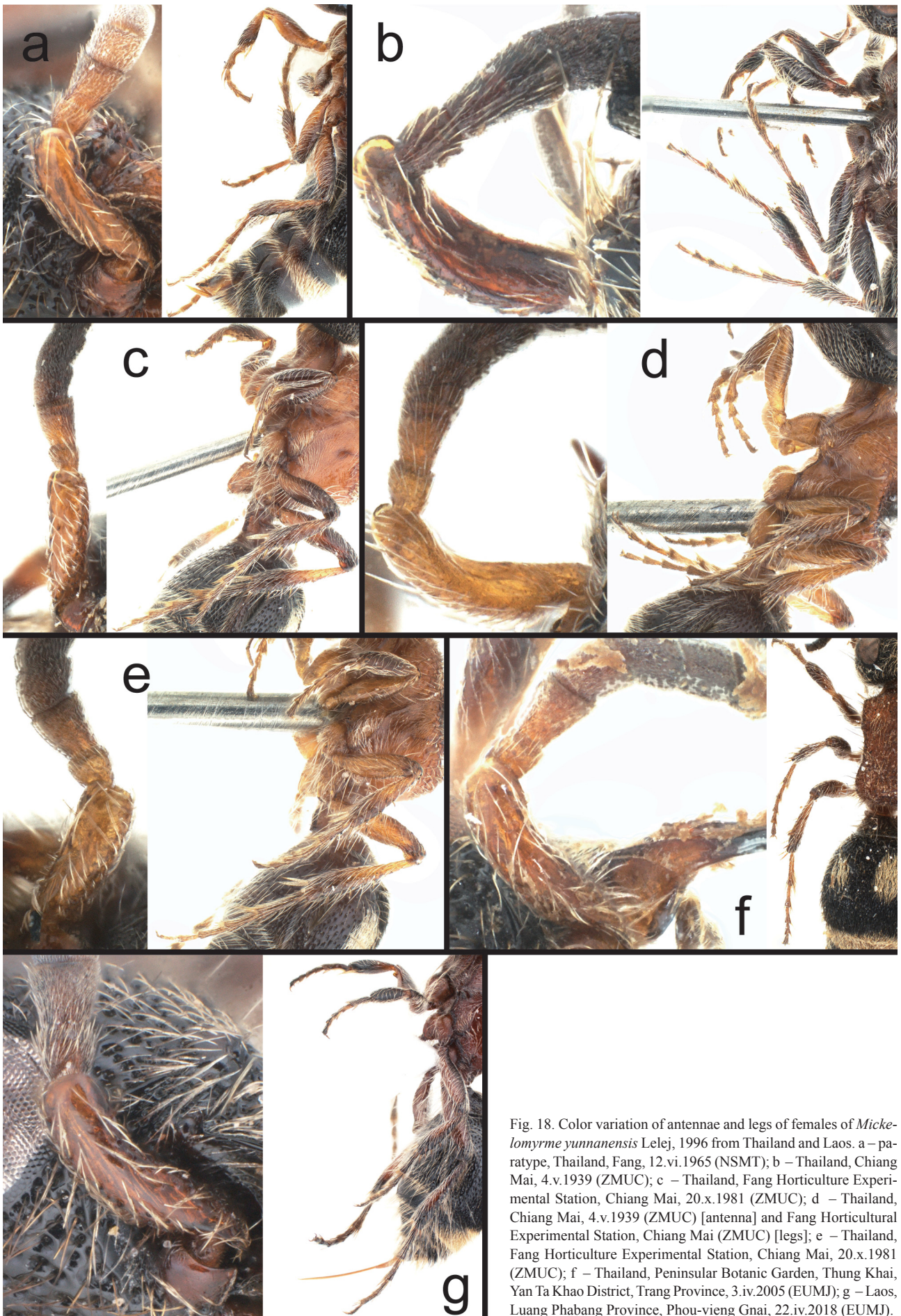


Fig. 18. Color variation of antennae and legs of females of *Mickelomyrme yunnanensis* Lelej, 1996 from Thailand and Laos. a – paratype, Thailand, Fang, 12.vi.1965 (NSMT); b – Thailand, Chiang Mai, 4.v.1939 (ZMUC); c – Thailand, Fang Horticulture Experimental Station, Chiang Mai, 20.x.1981 (ZMUC); d – Thailand, Chiang Mai, 4.v.1939 (ZMUC) [antenna] and Fang Horticultural Experimental Station, Chiang Mai (ZMUC) [legs]; e – Thailand, Fang Horticulture Experimental Station, Chiang Mai, 20.x.1981 (ZMUC); f – Thailand, Peninsular Botanic Garden, Thung Khai, Yan Ta Khao District, Trang Province, 3.iv.2005 (EUMJ); g – Laos, Luang Phabang Province, Phou-vieng Gnai, 22.iv.2018 (EUMJ).



**Remarks.** Two out of seven paratypes from Shaowu, one out of four paratypes from Chungan and one paratype from Tungan could not be found in TARI. Among the paratypes of *Sm. t. latisquamula* in TARI, I recognized two morphospecies. One (Figs 3–7) is identical to the holotype of *Sm. t. latisquamula*. The other species (Figs 13–17) bears the diagnostic characters of *Mickelomyrme*. Among the females of *Mickelomyrme*, this morphospecies was identified as *M. kuznetsovi* Lelej, 1996 using the key provided by LELEJ (1996b) and agreed well with its original description. *Mickelomyrme kuznetsovi* is currently known from North Vietnam and Laos only (LELEJ 1996b, BROTHERS & LELEJ 2017), so this is its first record from China (see Material examined above).

Concerning the differences between *Sm. t. triguttatus* (Figs 8–12) and *Sm. t. latisquamula* (Figs 3–7), CHEN (1957) mentioned that the subspecies *Sm. t. latisquamula* was “Similar to the typical subspecies, but the pale pubescence being bright golden yellow, and the bands on tergites II and III somewhat integumental”. In the key, Chen described the nominotypical subspecies as having “Antennal segment I and femora apically black; pubescent spots on tergite II and posterior fringes on II–III whitish” while he described *Sm. t. latisquamula* as having “Antennal segment I and legs uniformly ferruginous; pubescent spots on tergite II and posterior fringes on II–III bright golden yellow”. I examined photos of the holotype of *Sm. t. triguttatus* kindly provided by Lukas Kirschey (ZMHB). As a result, I regard the subspecies *Sm. t. latisquamula* as a junior subjective synonym of the nominotypical one for the following reasons: 1) *Sm. t. triguttatus* also has integumental yellow markings on T2 and T3; 2) the color of the antennae and legs varies greatly as observed in *Mickelomyrme yunnanensis* (Fig. 18) [*Smicromyrme* was revealed sister to *Mickelomyrme* by BROTHERS & LELEJ (2017) and I hence suppose the color variation is similar in both genera]; 3) these two “subspecies” are identical in structure.

*Smicromyrme triguttatus* can be placed in *Erimyrme* based on the following character states: the anterior margin of the dorsum of the pronotum arcuate; the scutellar scale slightly wider than long; the lateral angle of propodeum rounded; the lateral setal spots on T2 located posteriorly to the median one; the pygidial area elongate with its lateral margins subparallel; the surface of the pygidial area longitudinally striate basally and unsculptured on about the apical 1/4. Females of *Erimyrme* are similar to those of *Mickelomyrme*, but the scutellar scale is much wider and the basal spots on T2 are disposed in a straight transverse line in *Mickelomyrme*.

LELEJ (1995b) recorded this species under the name *Smicromyrme* (*Smicromyrme*) *triguttata latisquamula* Chen, 1957 from Vinh Phu, Vietnam. MICKEL (1933) described the pygidial area of *Sm. triguttatus* as “pygidial area covering most of the last tergite, finely, longitudinally striate, the striae reaching the apical margin”; however, the pygidial area of the holotype of *Sm. triguttatus* is striate on about the basal 3/4 and smooth apically (Fig. 11). LELEJ (1995b) probably identified the Vietnamese specimen based on the descriptions of MICKEL (1933) and CHEN (1957) and placed *Sm. triguttatus latisquamula* in *Smicromyrme* s.

str. Consequently, I consider that the Vietnamese specimen of LELEJ (1995b) belongs to a separate species.

### Genus *Sinotilla* Lelej, 1995

(Figs 19–40)

*Sinotilla* Lelej, 1995b: 18, ♂♀. Type species: *Smicromyrme boheanus* Chen, 1957, by original designation (misspelled as *boheana*).

**Diagnosis. Male.** Head elevated posteriorly; frons and vertex longitudinally striate; ocelli each with longitudinal carina posteriorly; anterior margin of clypeus protruding medially; mandible with one preapical inner denticle; ventral margin of mandible excised into large tooth or not excised and with weak lobe; F1 0.5–0.6 times as long as wide and 0.3–0.4 times the length of F2; maxillary palpus almost as long as antenna; pterostigma length (Fig. 23) less than 0.6 times the distance between pterostigma and base of RS on vein Sc + R; T2 and S2 each with lateral felt line, shorter on S; T7 densely punctate, sometimes with median longitudinal impunctate line; volsellar cuspis short and oval, apically and its inner margin with setae, without basal external lobe.

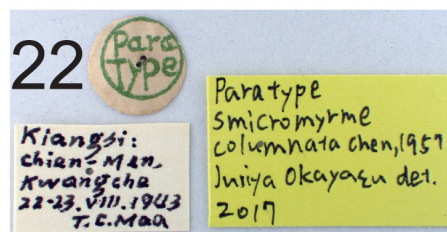
**Female.** Genal carina weakly developed; hypostomal teeth present; clypeus with median basal tubercle, and with protruding transverse lamellate carina on anterior margin; mandible slender; fore tarsus without external comb of spines; scutellar scale weak but distinct; T2 with apical narrow band of dense, appressed setae, slightly widened medially (except *Sinotilla spinicauda* comb. nov.); T3 with wide uniform band of dense, appressed setae; T6 lacking distinct flattened pygidium, glabrous, unsculptured and polished throughout, with lateral margins remarkably convergent basally and not carinate even apically.

**Species included.** *Smicromyrme serpa columnata*, *Sm. spinicauda*, and *Sm. trisectus* possess the diagnostic characters listed above. This genus includes 21 species including these ones (for the other 18 species see OKAYASU (2017) and OKAYASU et al. (2018)).

**Gender.** The gender of this genus was not mentioned in the original description. It is feminine according to LELEJ & BROTHERS (2008), so the original spellings of Chen's species are maintained below.

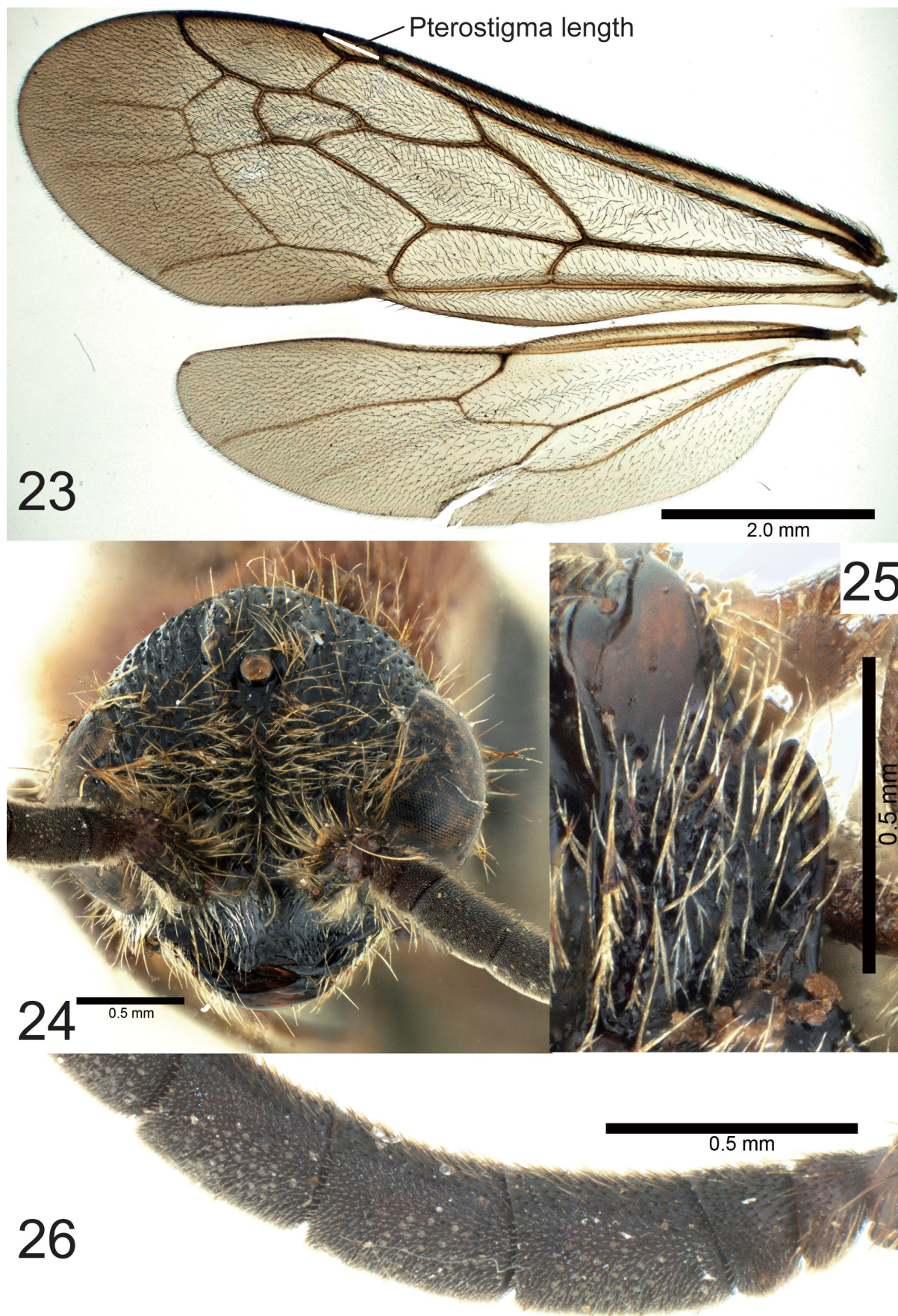
**Remarks.** Males of this genus are similar to those of *Ephucilla*, *Nordeniella* Lelej, 2005, and *Smicromyrme* in mandible narrowed to apex, propodeum without dorsal teeth, fully developed wing, and volsella without external lobe, but differ in mandible with lobe or tooth on ventral margin (without lobe or tooth in *Nordeniella*), maxillary palpus as long as antenna (much shorter in others), F1 0.5–0.6 times as long as wide (as long as wide in others) and S2 with short lateral felt line (without felt line in *Ephucilla* and *Nordeniella*). Females of this genus are similar to those of the genera *Promecilla*, *Nordeniella*, *Karunaratnea* Lelej, 2005, *Ephucilla*, and *Indratilla* Lelej, 1993 in having an indistinct pygidial area, but differ in having the scutellar scale weak but distinct (absent in *Promecilla* and *Nordeniella*; strongly developed in *Karunaratnea*) and pygidial area remarkably convergent basally without any trace of lateral carina (elongate with weak lateral carina apically in *Ephucilla* and *Indratilla*). Females of this genus can be divided into four





Figs 19–22. *Sinotilla serpa columnata* (Chen, 1957), ♂, paratype. 19 – habitus, dorsal view; 20 – habitus, lateral view; 21 – genitalia, inner view; 22 – labels.





Figs 23–26. *Sinotilla serpa columnata* (Chen, 1957), ♂, paratype. 23 – wings; 24 – face; 25 – mandible, outer view; 26 – pedicel and F1–F3.





Figs 27–29. *Sinotilla serpa serpa* (Zavattari, 1913), ♂, Taiwan. 27 – habitus, dorsal view; 28 – habitus, lateral view; 29 – genitalia, inner view.



expedient groups (OKAYASU 2017). In females, *Sinotilla* is similar to *Promecilla*, but in males they can be separated by F1 (as long as wide in *Promecilla*), maxillary palpus (much shorter than antenna in *Promecilla*), S2 (without lateral felt line in *Promecilla*), and the volsellar shape (with more or less widened external lobe in *Promecilla*).

***Sinotilla serpa columnata* (Chen, 1957),  
comb. nov., stat. nov.  
(Figs 19–26)**

*Smicromyrme columnata* Chen, 1957: 205, ♂. Type locality: “Kuling [= Guling]” (Jiangxi, China). Holotype: ♂ (TARI), examined.; LELEJ (2005: 58).

**Type material examined.** HOLOTYPE: ♂, Guling, Lushan, Jiangxi, China, 21.ix.1934, O. Piel leg. (TARI). PARATYPES: 1 ♂, Guling, Lushan, Jiangxi, China, 17.ix.1934, O. Piel leg. (TARI); 1 ♂, Guling, Lushan, Jiangxi, China, 18.ix.1934, O. Piel leg. (TARI); 1 ♂ (Figs 19–26), Chien-Men, Kwangtse, Fujian, China, 22.–23.viii.1943, T. C. Maa leg. (TARI).

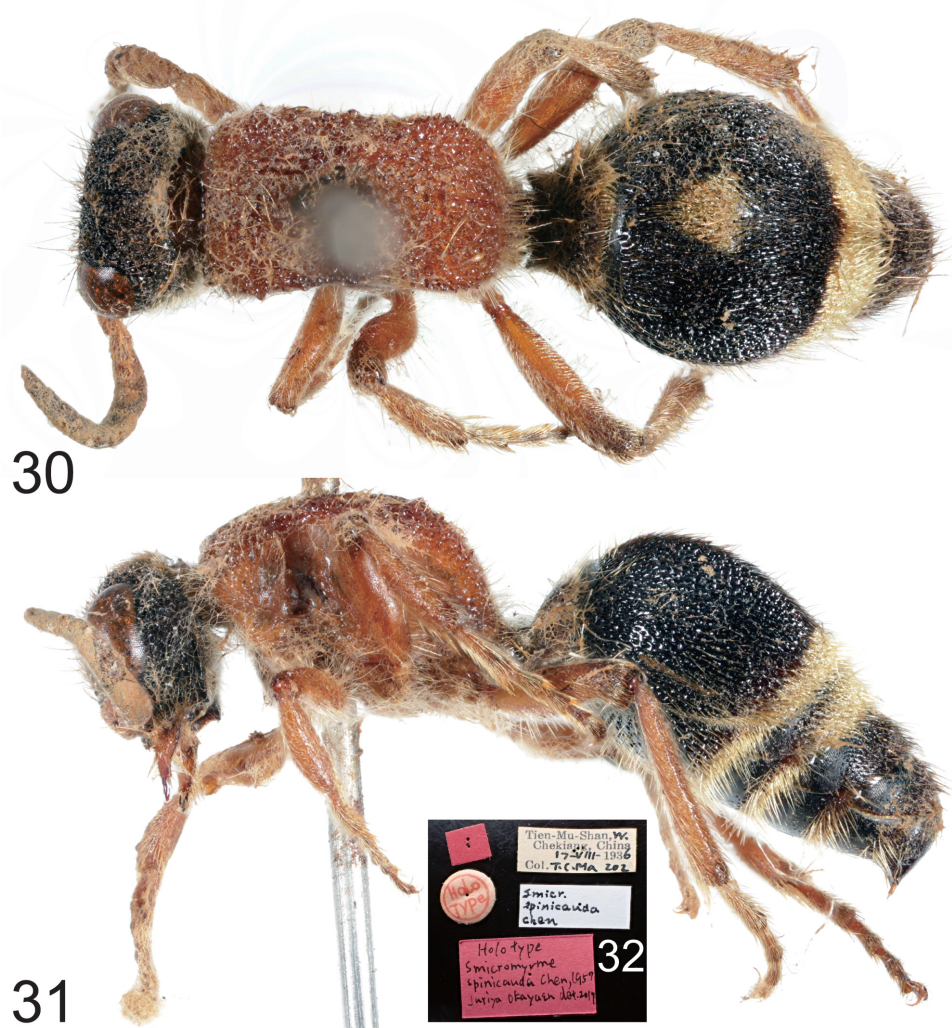
**Diagnosis. Male.** This species is similar to *Si. hong* Lelej, 1995, *Si. runcina* (Zavattari, 1914), and *Si. trisecta* comb. nov. in having mandible with a weak ventral lobe, but differs in the following combination of characters: mandible beneath weakly excised (Fig. 25; not excised in others: Fig. 39); POL/OOL = 0.668–0.863, 0.781 on average (0.8

in *Si. hong*; 0.500–0.646, 0.578 on average in *Si. runcina*; 0.675–0.747, 0.714 on average in *Si. trisecta*); POL/LOD = 2.86–4.27, 3.56 on average (1.76–2.45, 2.17 on average in *Si. runcina*; 2.95–4.07, 3.37 on average in *Si. trisecta*; unknown in *Si. hong*); frons with wide weak longitudinal carina extending from lateral ocellus (Fig. 24; with wide strong carina in *Si. trisecta* and probably in *Si. hong*: Fig. 38); mesosoma yellowish red except propleuron, mesopleuron, metapleuron, and propodeum black (in nominotypical subspecies scutellum, axilla, and metanotum are also black; mesopleuron and metapleuron yellowish red in *Si. hong*; propleuron dorsally and, mesopleuron and metapleuron in dorsal half yellowish red in *Si. runcina*; entirely black in *Si. trisecta*: Fig. 34); metasoma black (T1 on apical and lateral margins and segment 2 entirely yellowish red in *Si. trisecta*: Fig. 34); apical lobe of parapenial lobe robust (Figs 21, 29; more slender and basally constricted in *Si. runcina* and *Si. trisecta*: Fig. 35; unknown in *Si. hong*).

**Female.** Unknown.

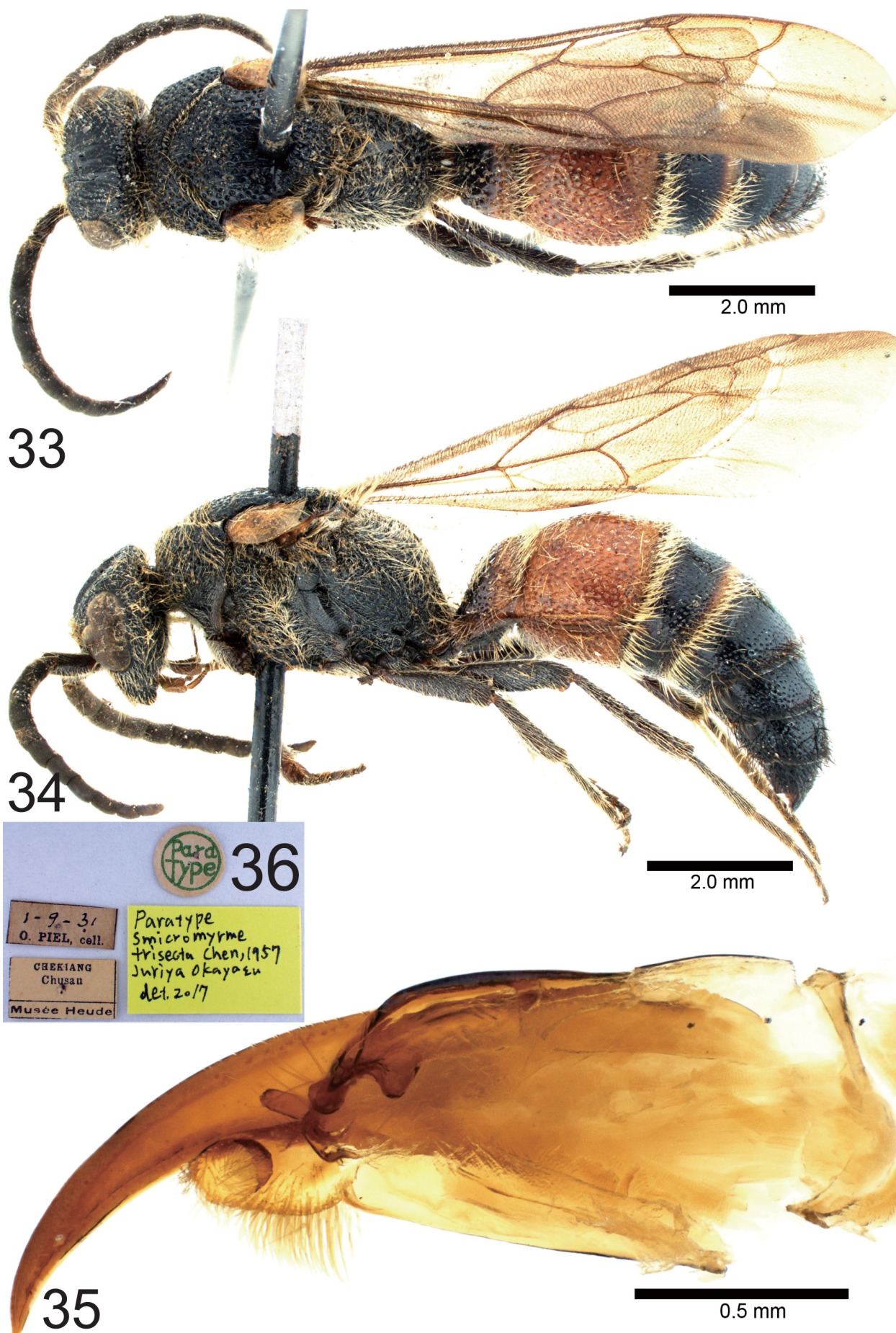
**Distribution.** China: Jiangxi, Fujian (CHEN 1957).

**Remarks.** One out of two paratypes from Kwangtse could not be found in TARI. *Smicromyrme columnatus* (mainland China) differs from *Sinotilla serpa* (Taiwan; Figs 27–29) in yellowish red scutellum, axilla, and metanotum (black



Figs 30–32. *Sinotilla spinicauda* (Chen, 1957), ♀, holotype. 30 – habitus, dorsal view; 31 – habitus, lateral view; 32 – labels.





Figs 33–36. *Sinotilla trisecta* (Chen, 1957), ♂, paratype. 33 – habitus, dorsal view; 34 – habitus, lateral view; 35 – genitalia, inner view; 36 – labels.



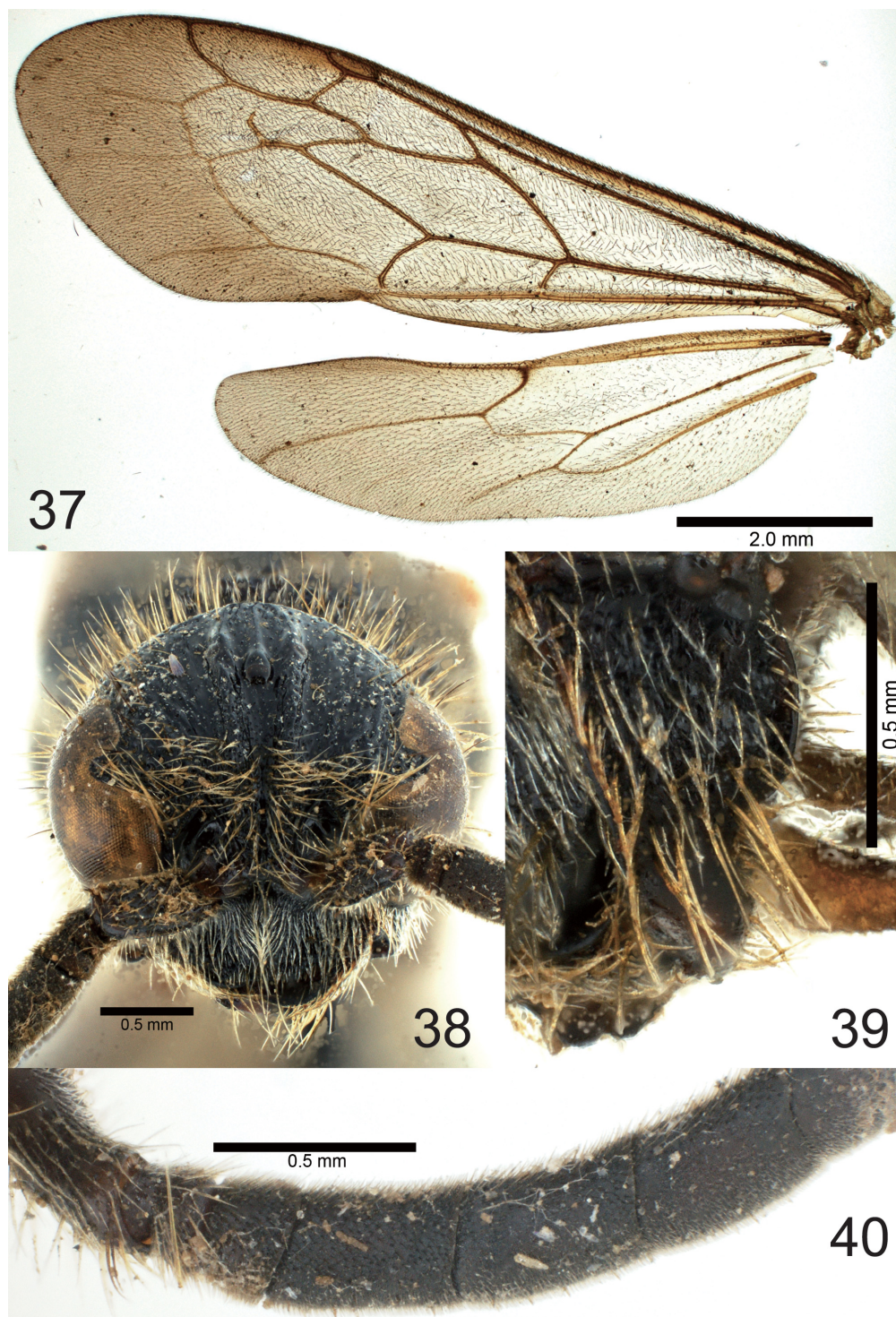
in *Si. serpa*). In other respects, these two taxa are identical including male genitalia. They do not have an overlapping distribution and are only very slightly different from each other. Although such variation in mesosomal color is sometimes observed in a single species even in the same geographical area (e.g. *Smicromyrme lewisi* Mickel, 1935 in the northern part of Honshû and Hokkaidô, Japan; TSUNEKI 1972, TERAYAMA et al. 2011), I treat *Sm. columnatus* as a subspecies of *Si. serpa* here. Discovery of the female or molecular experiments will give more insight into the relationship between them.

A specimen of *Si. runcina* from Sarawak has setal bands on T2 and T3, while specimens from the Malay Peninsula have setal bands on T1–T3. Therefore, the number of setal bands on the metasoma is not useful in separating *Si. serpa* and *Si. runcina*.

***Sinotilla spinicauda* (Chen, 1957), comb. nov.**

(Figs 30–32)

*Smicromyrme spinicauda* Chen, 1957: 210, ♀. Type locality: “Tienmushan [= Mt. Tianmu-shan]” (Zhejiang, China). Holotype: ♀ (TARI), examined.; LELEJ (2005: 64).



Figs 37–40. *Sinotilla trisecta* (Chen, 1957), ♂, paratype. 37 – wings; 38 – face; 39 – mandible, outer view; 40 – pedicel and F1–F3.



**Type material examined.** HOLOTYPE: ♀ (Figs 30–32), Mt. Tianmu-shan, W. Zhejiang, China, 17.viii.1936, T. C. Maa leg. (TARI).

**Diagnosis. Female.** This species is similar to *Si. belokobylskiji* Lelej, 1995, *Si. calopoda* Okayasu, 2017, *Si. lambirensis* Lelej, 1996, *Si. ohbayashii* Okayasu, 2017, and *Si. petina* (Mickel, 1937) in having the diagnostic characters of group 2 (OKAYASU 2017; T2 with a basal median pale spot of setae and black integument), but differs in the following combination of characters: mesosoma weakly convergent posteriorly (subparallel in *Si. belokobylskiji*, *Si. calopoda*, *Si. lambirensis*, *Si. ohbayashii*, and *Si. petina*); scutellar scale narrow and trilobed (not trilobed in others), median lobe posteriorly turning into median longitudinal carina extending through propodeal face (not turning into carina in *Si. ohbayashii*; unknown in *Si. petina*), dorsal edge of postscutellar carina strongly undulating (very weakly undulating in *Si. belokobylskiji*, *Si. calopoda*, and *Si. lambirensis*); legs entirely yellowish red (black and yellowish red in *Si. calopoda*); T2 with apical narrow band of dense, appressed golden setae, slightly narrowed medially (slightly widened in others); S2–S3 with apical narrow band of dense, appressed golden setae (metasomal sterna without such bands in *Si. petina*); T2 and S2 polished and strongly shining between punctures (micro-punctate and dimly shining in *Si. calopoda*).

**Male.** Unknown.

**Distribution.** China: Zhejiang (CHEN 1957).

**Remarks.** This species is known from the holotype only.

***Sinotilla trisecta* (Chen, 1957), comb. nov.**

(Figs 33–40)

*Smicromyrme trisecta* Chen, 1957: 206, ♂. Type locality: “Chusan [= Zhoushan]” (Zhejiang, China). Holotype: ♂ (TARI), examined; LELEJ (2005: 64).

**Type material examined.** HOLOTYPE: ♂, Zhoushan, Zhejiang, China, 1.ix.1931, O. Piel leg. (TARI). PARATYPES: 1 ♂, Zhoushan, Zhejiang, China, 29.viii.1931, O. Piel leg. (TARI); 1 ♂ (Figs 33–40), Zhoushan, Zhejiang, China, 1.ix.1931, O. Piel leg. (TARI); 2 ♂♂, Zhoushan, Zhejiang, China, 7.ix.1931, O. Piel leg. (TARI); 1 ♂, Zhoushan, Zhejiang, China, 8.ix.1931, O. Piel leg. (TARI); 1 ♂, Zhoushan, Zhejiang, China, 10.ix.1931, O. Piel leg. (TARI).

**Diagnosis. Male.** This species differs from other species of *Sinotilla* in the mesosoma entirely black and the metasoma with some basal segments yellowish red. See the discussion above for other useful characters.

**Female.** Unknown.

**Distribution.** China: Zhejiang (CHEN 1957).

**Remarks.** All the type material was found in TARI.

In general appearance, this species is similar to the males of *Promecilla* (with black mesosoma and basally red metasoma), but in other aspects this species really fits the diagnosis of *Sinotilla* (see above). All other males of *Sinotilla* have a different color pattern; the mesosoma is more or less red and the metasoma black or with bluish metallic luster. Such color diversity in male body color can be observed also in *Ephucilla* (LELEJ 1995b).

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