

RESEARCH PAPER

## A review of the *Stenus aureolus* group of China (Coleoptera: Staphylinidae)

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Accepted:  
16<sup>th</sup> November 2020

Published online:  
3<sup>rd</sup> December 2020

**Abstract.** The species of the *Stenus aureolus* group occurring in China are revised. Ten species are recognized, of which six are described as new: *S. mendaensis* sp. nov. from Qinghai, *S. aduncus* sp. nov. from Sichuan, *S. platydentatus* sp. nov., *S. tenuidentatus* sp. nov., *S. paratrignuroides* sp. nov., and *S. alpigenus* sp. nov. from Yunnan. *Stenus ambiseminiger* Zhao & Zhou, 2006 is transferred from the synonymy with *S. trignuroides* Zheng, 1993 to the synonymy with *S. aureolus* Fauvel, 1875. *Stenus aureolus* is newly recorded from China (Heilongjiang, Jilin, Neimenggu). New province records are reported for *S. trignuroides* (Sichuan, Ningxia, Shaanxi, Qinghai, Gansu). Habitus and diagnostic characters of all species are photographed. A key to Chinese species of the group is provided.

**Key words.** Coleoptera, Staphylinidae, *Stenus aureolus* group, new species, identification key, China

**Zoobank:** <http://zoobank.org/urn:lsid:zoobank.org:pub:33D1CD77-7BC6-4083-8FD7-8F7DDAE309A6>

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### Introduction

In his revision of Chinese species of the rove beetle genus *Stenus* Latreille, 1796 (Coleoptera: Staphylinidae: Steninae), PUTHZ (2012) assigned *S. musicola* Cameron, 1930 and *S. aureolus* Fauvel, 1875 to the *Stenus aureolus* group. Presently, three species of the group have been recorded from China: *Stenus trignuroides* Zheng, 1993 from Sichuan, Ningxia and Heilongjiang (ZHENG 1993; ZHAO & ZHOU 2006, as *S. ambiseminiger* Zhao & Zhou, 2006; TANG & LI 2013), *S. nigraureolus* Ryvkin, 2003 from Xinjiang (RYVKIN 2003), and *S. musicola* from Yunnan (PUTHZ 2012). Additionally, six new species of the group are recognized in this paper from China, and *S. aureolus* known previously from the Russian Far East is first reported from China. The species of the *Stenus aureolus* group share very similar appearance: body size 3.4–5.3 mm, body entirely blackish with reddish to dark brown legs, punctuation of entire body dense and confluent, interstices more or less reticulated, abdomen with broad paratergites, paraglossae oval, legs relatively stout, tarsomere IV relatively simple or shortly bilobed, male meso- and metatibiae each with a tooth on inner side of apex. The male

genitalia of some species in the group, e.g., *S. aureolus* and *S. trignuroides*, are extremely similar to each other including expulsion clasps (Fig. 31, arrow), and only the lengths of the apical sclerotized areas of the median lobe (Fig. 12, arrow) are more or less different. Fortunately, the spermatheca is strongly sclerotized and can be used to identify the species. The spermatheca is comprised of the basal porch and spermathecal tube. The basal porch is bilobed or trumpet-shaped. The spermathecal tube bends twice: it is usually very coiled at the first bend (Fig. 18, arrow) and ends with RT-duct (terminology according to NAOMI 2006) and a small capsule.

### Material and methods

The specimens examined in this paper were collected by sifting leaf litter in forests and killed in ethyl acetate. For examination of the genitalia, the last three abdominal segments were detached from the body after softening in hot water. The aedeagi or the spermathecae, together with other dissected pieces, were mounted in Euparal (Chroma Gesellschaft Schmidt, Koengen, Germany) on plastic slides attached below the beetle. Photos of sexual characters were



taken with a Canon G9 camera attached to an Olympus SZX 16 stereoscope; habitus photos were taken with a Canon macro photo lens MP-E 65 mm attached to a Canon EOS7D camera and stacked with Zerene Stacker (<http://www.zereneystems.com/cms/stacker>).

The type specimens treated in this study are deposited in the following public and private collections:

APEG Andreas Pütz's collection, Eisenhüttenstadt, Germany;

ASTJ Aleš Smetana's collection (in the National Museum of Natural History, Tsukuba), Japan;  
 BFMG Benedikt Feldmann's collection, Münster, Germany;  
 MSBG Michael Schülke's collection, Berlin (in the Museum für Naturkunde, Berlin), Germany;  
 NMPC Department of Entomology, National Museum, Praha, Czech Republic;  
 SHNU Department of Biology, Shanghai Normal University, P. R. China;  
 VPSG Volker Puthz's collection, Schlitz (in the Staatliches Museum für Naturkunde, Stuttgart), Germany.



Figs 1–5. Habitus. 1 – *Stenus aureolus* Fauvel, 1875; 2 – *S. trigonuroides* Zheng, 1993; 3 – *S. musicola* Cameron, 1930; 4 – *S. nigraureolus* Ryvkin, 2003; 5 – *S. mendaensis* sp. nov. Scale bars = 1 mm.

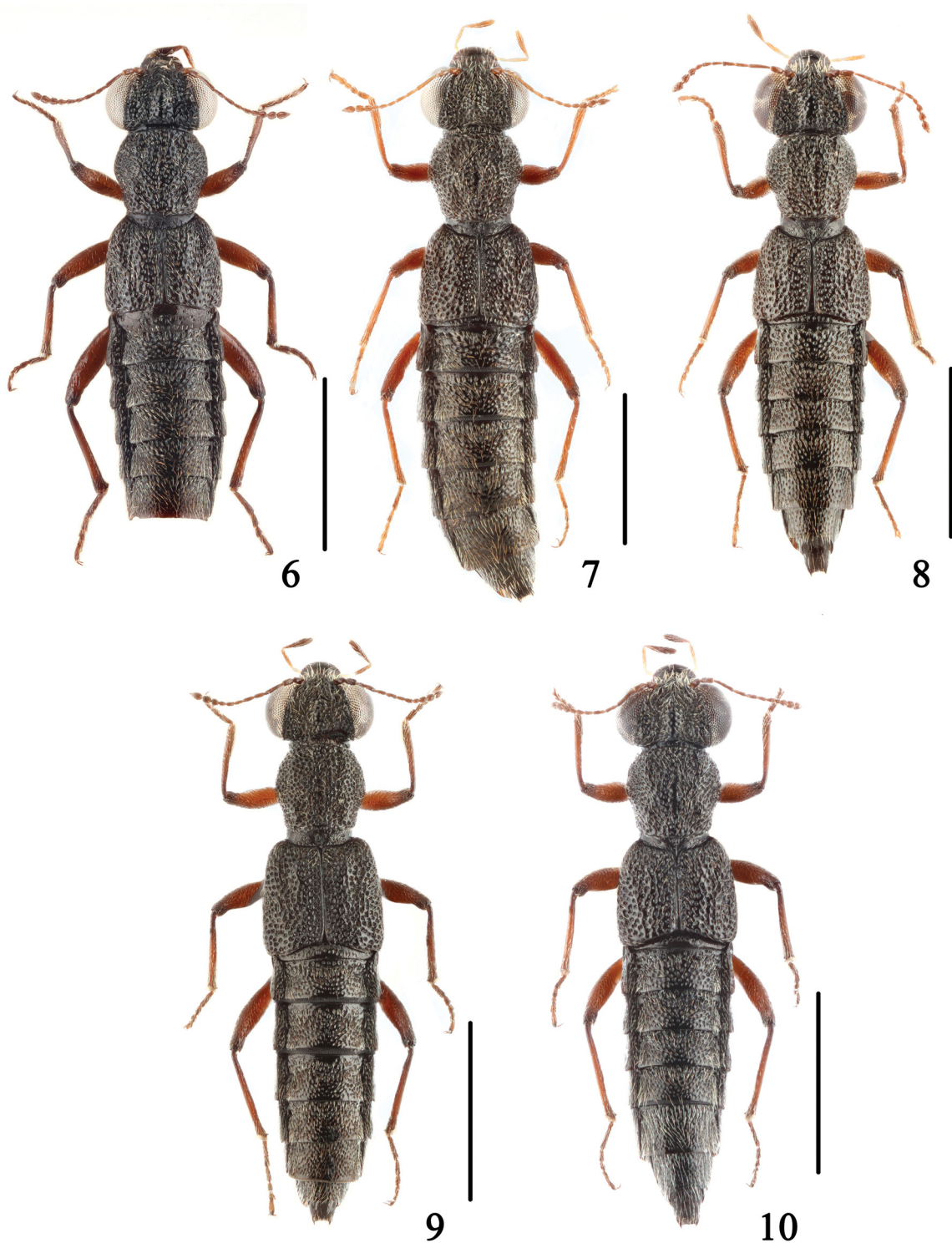
The body measurements are abbreviated as follows:

BL	body length, measured from the anterior margin of the clypeus to the posterior margin of abdominal tergite X;
EL	length of elytra, measured from humeral angle;
EW	width of elytra;
FL	forebody length, measured from the anterior margin of the clypeus to the apex of the elytra (apicolateral angle);
HW	width of head including eyes;
PL	length of pronotum;
PW	width of pronotum;
SL	length of elytral suture.

## Taxonomy

### *Stenus aureolus* group

**Diagnosis.** Medium body size: 3.4–5.3 mm; body entirely blackish, with legs reddish to dark brown; pubescence short but distinct; punctuation of entire body dense and confluent, interstices more or less reticulated; abdomen with broad paratergites; paraglossae oval; legs relatively stout; tarsomere IV relatively simple or shortly bilobed; male meso- and metatibiae each with tooth on inner side



Figs 6–10. Habitus. 6 – *Stenus aduncus* sp. nov.; 7 – *S. platydentatus* sp. nov.; 8 – *S. tenuidentatus* sp. nov.; 9 – *S. paratriginuroides* sp. nov.; 10 – *S. alpigenus* sp. nov. Scale bars = 1 mm.



of apex; spermathecae strongly sclerotized, comprising of basal porch and spermathecal tube.

### *Stenus aureolus* Fauvel, 1875

(Figs 1, 11–14)

*Stenus aureolus* Fauvel, 1875: XVII.

*Stenus fluviatilis* Benick, 1921: 140. PUTHZ (1967: 241; synonymized with *S. aureolus*).

*Stenus ambiseminiger* Zhao & Zhou, 2006: 286, **syn. nov.** (previously erroneously synonymized with *S. trigonuroides* by PUTHZ (2008: 173)).

**Material examined.** RUSSIA: KHABAROVSK: 1 ♀, Bolshe-Khekhtsyrsky, Reserve, 6–10.vi.1990, 400–450 m, W. Schawaller leg. (VPSG); 1 ♂, Slavianska, 20 km N of Troitskoye, 14–19.vi.1990, Amur bank, W. Schawaller leg. (VPSG); 1 ♂ 1 ♀, East Siberia, Irkutsk Territory, Angarsk, 2.vii.2008, I.V. Enustschenko leg. (VPSG); 1 ♂, East Siberia, Irkutsk Territory, Katangskiy district, Podvoloshino, valley of Nizhnaya, 4–9.viii.2008, Tunguska R., Shavrin A. & Enustschenko I leg. (VPSG). CHINA: HEILONGJIANG: 3 ♂♂, Yichun City, Fenlin County, 9.vii.2004, Li-Zhen Li leg. (SHNU); 1 ♀, Yichun, Wuying, Wuying Forest Park, 11.vii.2004, Huang Jia-Jie leg. (SHNU); 1 ♀, Huma County, Houhei Town, 580 m, 15.vii.2009, Li & Liu leg. (SHNU). JILIN: 3 ♂♂ 4 ♀♀, Korean pine forest, Mt. Changbai, 23.vii.2004, Li & Huang leg. (SHNU). NEIMENGGU: 1 ♀, Hulunbeier City, Erlunchun Ganhe-Kuerbin, 570 m, 16.vii.2009, Li & Liu leg. (SHNU); 1 ♀, Tahe-Mohe County, 500–600 m, 16.vii.2009, Li & Liu leg. (SHNU); 6 ♂♂ 8 ♀♀, Xiaoyangqi Town, Daxing'anling, 9.viii.2011, Xu Wang leg. (SHNU).

**Previously published records from China.** HEILONGJIANG: Langxiang, Qingyuan (ZHAO & ZHOU 2006, as *Stenus ambiseminiger*).

**Differential diagnosis.** *Stenus aureolus* Fauvel, 1875 is extremely similar to *S. trigonuroides* Zheng, 1993 in most aspects. The ratio of HW/EW in *S. aureolus* is slightly smaller than that of *S. trigonuroides*. The hind wings of *S. aureolus* are 1.27–1.39 times as long as elytra, i.e. shorter than those of *S. trigonuroides* (1.88–3.19 times as long as elytra). The aedeagus of *S. aureolus* (Fig. 12) is almost the same as in *S. trigonuroides* (Fig. 16), though the length of apical sclerotized area of median lobe is slightly shorter in *S. aureolus*. The spermathecae of these two species are clearly different: the spermatheca is simple without coiled parts in *S. aureolus* (Fig. 14), but has complicated coiled parts in *S. trigonuroides* (Fig. 18). *Stenus aureolus* is also very similar to *S. paratrigonuroides* sp. nov. in most aspects. The length of the apical sclerotized area of the median lobe of *S. aureolus* is slightly shorter and narrower than that of *S. paratrigonuroides* (Fig. 39). The spermatheca is simple in *S. aureolus* while it is coiled in *S. paratrigonuroides* (Fig. 41). Additionally, the distributional ranges of the *S. aureolus* and *S. paratrigonuroides* are separated by that of *S. trigonuroides* (Fig. 46).

**Redescription. Measurements.** BL: 3.5–4.2 mm, FL: 1.8–2.1 mm, HW: 0.77–0.87 mm, PL: 0.57–0.68 mm, PW: 0.59–0.68 mm, EL: 0.76–0.87 mm, EW: 0.77–0.91 mm, SL: 0.56–0.68 mm. Head 0.92–1.01 times as wide as elytra; pronotum 0.93–1.00 times as long as wide; elytra 0.94–0.99 times as long as wide; hind wings 1.27–1.39 times as long as elytra.

**Male.** Mesotibiae and metatibiae each with a tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 13) with distinct apicolateral projections, posterior margin serrate. Aedeagus (Figs 11, 12) slender; apical sclerotized area of median lobe medium in length and pointed at tip;

expulsion clasps slender, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 15–20 setae in distal and 6 or 7 setae in basal group.

**Female.** Sternite VIII prominent in middle of posterior margin; spermatheca (Fig. 14) sclerotized with basal porch bilobed, spermatheca duct simple without coiled parts, capsule small.

**Distribution.** China (Heilongjiang, Jilin, Neimenggu), Russia, Mongolia. New species for China.

**Remark on synonymy.** *Stenus ambiseminiger* Zhao & Zhou, 2006 was synonymized with *S. trigonuroides* by PUTHZ (2008). However, the shape of the spermatheca illustrated in the original description of *S. ambiseminiger* perfectly fits that of *S. aureolus*. The type locality of *S. ambiseminiger* (Heilongjiang: Langxiang, Qingyuan) is within the distribution range of *S. aureolus*. In contrast, *S. trigonuroides* has not been found in North West China yet. For these reasons, *S. ambiseminiger* is synonymized with *S. aureolus*.

### *Stenus trigonuroides* Zheng, 1993

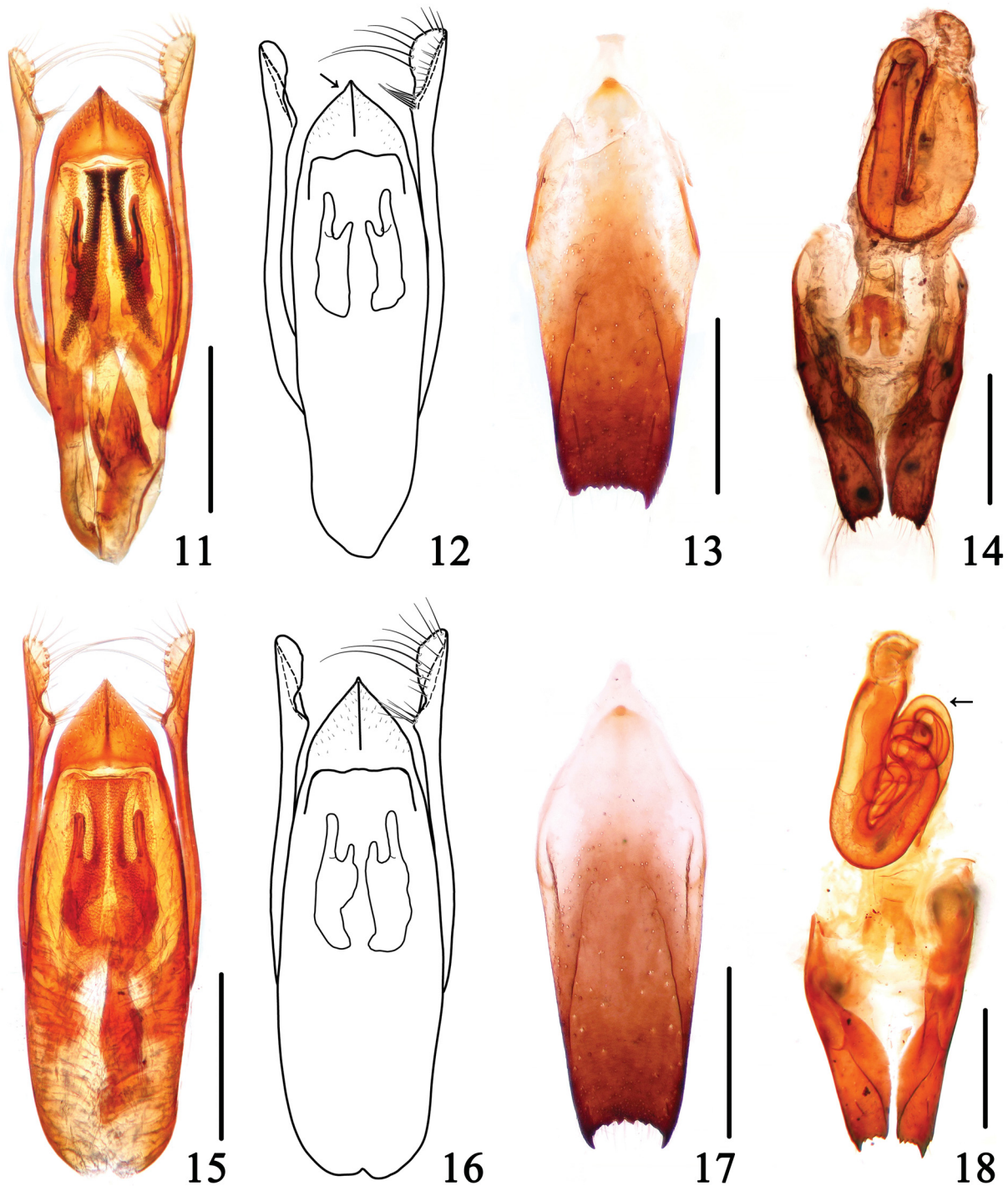
(Figs 2, 15–18)

*Stenus trigonuroides* Zheng, 1993: 229. PUTHZ (2008: 173); TANG & LI (2013: 4).

**Type material examined.** PARATYPE: CHINA: SICHUAN: 1 ♀, Emeishan, near Jinding, 26.vii.1983 (label written in Chinese, VPSG).

**Additional material examined.** CHINA: SICHUAN: 12 ♂♂ 9 ♀♀, Emeishan, Jinding, 29°31'N, 103°20'E, alt 3000 m, 20.vii.2012, Peng, Dai & Yin leg. (SHNU); 2 ♀♀, Ganzi Tibetan Auton Pref., Batang Co., Shaluli Shan, *Abies*-Forest, 55 km NE Batang, 30°07'68"N, 100°03'77"E, 4200 m, 3.vii.1999, A. Pütz leg. (APEG); 1 ♂ 1 ♀, Ya'an Pref., Shimian Co., Xiaoxiang Ling, Pass between Shimian-Ganluo, 27 km SE Shimian, 2450 m, 29°02'75"N, 102°31'48"E, springfed-swamp, 8.vii.1999, A. Pütz leg. (APEG); 2 ♀♀, 20 km W of Luhua, 2750–3200 m, mixed forest, 8–28.vi.2004, R. Fabbri leg. (MSBG); 1 ♂, Ya'an Prefecture, Shimian Co., Xiaoxiang Ling, Pass zw., Shimian u., Ganluo [= pass between Shimian and Ganluo], 27 km SE Shimian, 29°03'N, 102°31'E, 2450 m, Quellsumpf, Bachufer [= headspring wetland, streamside], 8.vii.1999, M. Schülke leg. (MSBG); 1 ♂, Yan Yuan, Chuandongzi-Massif, 27°20'22"N, 101°32'43"E, 4100 m, 9–19.vi.2017, Reuter leg. (BFMG). NINGXIA: 2 ♂♂ 2 ♀♀, Jinyuan County, Fengtai Lingchang, alt. 2310 m, 22–28.vi.2008, Yin Zi-Wei leg. (SHNU). SHAANXI: 2 ♂♂, Foping, alt. 1400–1800 m, 19.vii.2004, Hu, Tang & Zhu leg. (SHNU). QINGHAI: 1 ♂, Menda N. R., alt. 2200–2500 m, Hu, Tang & Zhu leg. (SHNU); 1 ♂, Lang Shi Dang Jing Qu Park, 75km NW Honggu, 2925 m, 36°54'05.2"N, 102°21'07.1"E, creek valley on overgrown scree, *Populus* and *Betula* forest with *Rhododendron*, litter sifted between rocks, 28.vi.2011, M. Schülke leg. (MSBG); 1 ♀, road 301 km, 180.43 km ESE Men Yuan, 2704 m, 37°09'32.6"N, 102°02'06.0"E, creek valley with *Picea*, *Salix*, *Populus*, *Betula*, litter and moss sifted, 5.vii.2011, M. Schülke leg. (MSBG). GANSU: 1 ♀, 'Mts.' [the name of the mountains is not provided on the label], 25km E Xiahe, 2805–2925 m, 3.viii.1994, A. Smetana leg. (ASTJ); 3 ♀♀, Xinlong shan, cca 70 km of Lanzhou, 2225–2380 m, 7.viii.1994, A. Smetana leg. (ASTJ); 1 ♂, Xiahe env., 35°11.5'N, 102°30.6'E, 2940 m, 19–22.vi.2005, J. Hájek, D. Král & J. Růžička leg. (NMPC); 1 ♂, Min Shan, 45km SW Longnan, 2200 m, 33°03'13"N, 104°40'57"E, (secondary pine forest with hazelnut, moist litter/moss/soil sifted), 6.viii.2012, D. W. Wrase leg. (MSBG); 1 ♂, Mts., 38km SE Longnan, 2060 m, 33°11'20"N, 105°14'24"E, (W slope with scree/scrubs/tall herbaceous vegetation, roots/soil/moss sifted), 7.viii.2012, D. W. Wrase leg. (MSBG).

**Previously published records from China.** SICHUAN: Wolong and Mt. Emei (ZHENG 1993). NINGXIA: Jinyuan (TANG & LI 2013).



Figs 11–18. Sexual characters. 11–14 – *Stenus aureolus* Fauvel, 1875; 15–18 – *S. trigonuroides* Zheng, 1993. 11, 12, 15, 16 – aedeagus; 13, 17 – male sternite IX; 14, 18 – spermatheca. Scale bars = 0.25 mm.

**Differential diagnosis.** The species is extremely similar to *S. aureolus* distributed in the Russian Far East and northern China, and to *S. paratrigonuroides* sp. nov. distributed in Yunnan (Fig. 46). The differences between appearances of the three species can be hardly noticed: the ratio of HW/EW of *S. trigonuroides* is in average slightly smaller than those of *S. aureolus* and *S. paratrigonuroides*. Hind wings of *S. trigonuroides* are distinctly longer (1.88–3.19 times as long as elytra) than those of *S. aureolus* (1.27–1.39 times as long as elytra) and *S. paratrigonuroides* (slightly longer than half the elytra). For an accurate identification, genitalia

dissection is necessary. The apical sclerotized area of the median lobe in *S. trigonuroides* (Fig. 16) is longer than that in *S. aureolus* (Fig. 12) and relatively wider and shorter than that of *S. paratrigonuroides* (Fig. 39). The spermatheca of *S. trigonuroides* (Fig. 18) is more complicated than that of *S. aureolus* (Fig. 14), with coiled tube at the first bend.

**Redescription. Measurements.** BL: 3.4–4.5 mm, FL: 1.8–2.2 mm. HW: 0.76–0.87 mm, PL: 0.57–0.67 mm, PW: 0.59–0.67 mm, EL: 0.78–0.97 mm, EW: 0.75–0.98 mm, SL: 0.58–0.76 mm. Head 0.83–0.96 times as wide as elytra; pronotum 0.94–1.03 times as long as wide; elytra



0.94–1.02 times as long as wide; hind wings 1.88–3.19 times as long as elytra.

**Male.** Mesotibiae and metatibiae each with tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 17) with distinct apicolateral projections, posterior margin serrate. Aedeagus (Figs 15, 16) slender; apical sclerotized area of median lobe medium in length and pointed at tip; expulsion clasps slender, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 14–18 setae in distal and 6 setae in basal group.

**Female.** Sternite VIII prominent in middle of posterior margin; spermatheca (Fig. 18) sclerotized with basal porch bilobed, spermatheca duct coiled at first bend, capsule small.

**Distribution.** China (Sichuan, Ningxia, Shaanxi, Qinghai, Gansu). New to Shaanxi, Qinghai and Gansu.

### *Stenus musicola* Cameron, 1930

(Figs 3, 19–21)

*Stenus musicola* Cameron, 1930: 339; PUTHZ (1976: 11); PUTHZ (2012: 100).

**Material examined.** NEPAL: 1 ♂, Thorong pass near Muktinath, S. Hang [south slope], 4500 m, Pa 343, H. Franz leg. (VPSG). 1 ♂, ix–x.1971, H. Franz leg. (VPSG); 1 ♂, Solukhumbu, Distr., Goyom above Sete, 3100 m, 10.v.1997, W. Schawaller leg. (VPSG). INDIA: HIMACHAL PRADESH: 1 ♂, Rohtangpass, S. Hang, 2500–3500 m, H. Franz leg. (VPSG).

**Previously published records from China.** YUNNAN: Heishui, N. Lijiang (PUTHZ 2012); Zhongdian (PUTHZ 2012); Nujiang, Lishui, Goligongshan, NW Liuku (PUTHZ 2012). QINGHAI: Baiyan (PUTHZ 2012).

**Differential diagnosis.** The species can be readily recognized from other species of the group by the combination of the following characters: larger body size with FL = 2.3–2.6 mm, elytra longer with EL/EW = 1.02–1.09, abdominal tergite VII with apical membranous fringe, hind tarsi with segments IV indistinctly emarginated on apical margin; aedeagus with apical sclerotized area of median lobe short and expulsion clasps very large (Fig. 20).

**Redescription. Measurements.** BL: 4.7–5.3 mm, FL: 2.3–2.6 mm, HW: 0.86–0.87 mm, PL: 0.70–0.71 mm, PW: 0.70–0.74 mm, EL: 0.96–1.11 mm, EW: 0.88–1.09 mm, SL: 0.70–0.93 mm. Head 0.80–0.98 times as wide as elytra; pronotum 0.96–1.01 times as long as wide; elytra 1.02–1.09 times as long as wide.

**Male.** Mesotibiae and metatibiae each with tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 21) with distinct apicolateral projections, posterior margin serrate. Aedeagus (Figs 19, 20) robust; apical sclerotized area of median lobe short in length and sharply pointed at tip; expulsion clasps very large, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 10–15 setae in distal and 3–5 setae in basal group.

**Female.** Though a few females were examined and listed in PUTHZ (1976, 2012), no details of the female characters have been described or illustrated yet.

**Distribution.** China (Yunnan, Qinghai), Pakistan, India, Nepal, Bhutan.

### *Stenus nigraureolus* Ryvkin, 2003

(Figs 4, 22)

*Stenus nigraureolus* Ryvkin, 2003: 93.

**Type material examined.** PARATYPE: CHINA: XINJIANG: 1 ♀, Tien Shan, Narat Mt Ridge (N slope), Syao-Jerglan River Basin, Tuyuk-Asha River combe, 12 km up stream of Chashi, 2600–2700 m a. s. l., in litter under *Picea schrenkiana* with withered *Gramineae*, 27.vii.2001, S. V. Saluk leg. (label written in Russian, VPSG).

**Differential diagnosis.** The species can be readily recognized from other brachypterous species of the group by distinct reticulation on head and pronotum, and by darker legs.

**Redescription. Measurements.** BL: 4.5 mm, FL: 2.0 mm, HW: 0.88 mm, PL: 0.64 mm, PW: 0.68 mm, EL: 0.81 mm, EW: 0.91 mm, SL: 0.62 mm. Head 0.97 times as wide as elytra; pronotum 0.93 times as long as wide; elytra 0.88 times as long as wide.

**Male** (based on the descriptions by RYVKIN 2003). Mesotibiae and metatibiae each with a tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX with distinct apicolateral projections, posterior margin serrate. Aedeagus (RYVKIN 2003: fig. 2) slender; apical sclerotized area of median lobe medium in length and pointed at tip; expulsion clasps slender, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 7–11 setae in distal and 4 setae in basal group.

**Female.** Sternite VIII prominent in middle of posterior margin; spermatheca (Fig. 22) sclerotized with basal porch bilobed, spermatheca duct coiled at first bend, capsule small.

**Distribution.** China (Xinjiang).

### *Stenus mendaensis* sp. nov.

(Figs 5, 23–26)

**Type material.** HOLOTYPE: CHINA: QINGHAI: ♂, glued on a card with labels as follows: “Menda N. R., alt. 2200–2500 m, 24.vii.2004, Hu, Tang & Zhu leg.”, “Holotype / *Stenus mendaensis* / Shuai, Tang & Luo” [red handwritten label] (SHNU). PARATYPES: CHINA: QINGHAI: 2 ♀♀, same label data as for the holotype (SHNU).

**Differential diagnosis.** The new species can be distinguished from other species of the *Stenus aureolus* group by the combination of the following characters: smaller in body size, head and pronotum with interstices partially and indistinctly reticulated, elytra short (brachypterous), hind tarsomeres IV relatively simple; aedeagus with apical sclerotized area of median lobe medium in length (Fig. 24); spermatheca with spermatheca duct complicated coiled at the first bend (Fig. 26).

**Description.** Brachypterous. Body entirely black, antennae reddish brown with club darker, maxillary palpi with first and basal half of second segments yellowish brown, remaining parts reddish brown, legs reddish brown with knees darker.

**Measurements.** BL: 3.5–3.7 mm, FL: 1.6–1.7 mm, HW: 0.72–0.76 mm, PL: 0.52–0.56 mm, PW: 0.56–0.59 mm, EL: 0.59–0.64 mm, EW: 0.73–0.78 mm, SL: 0.43–0.46 mm.



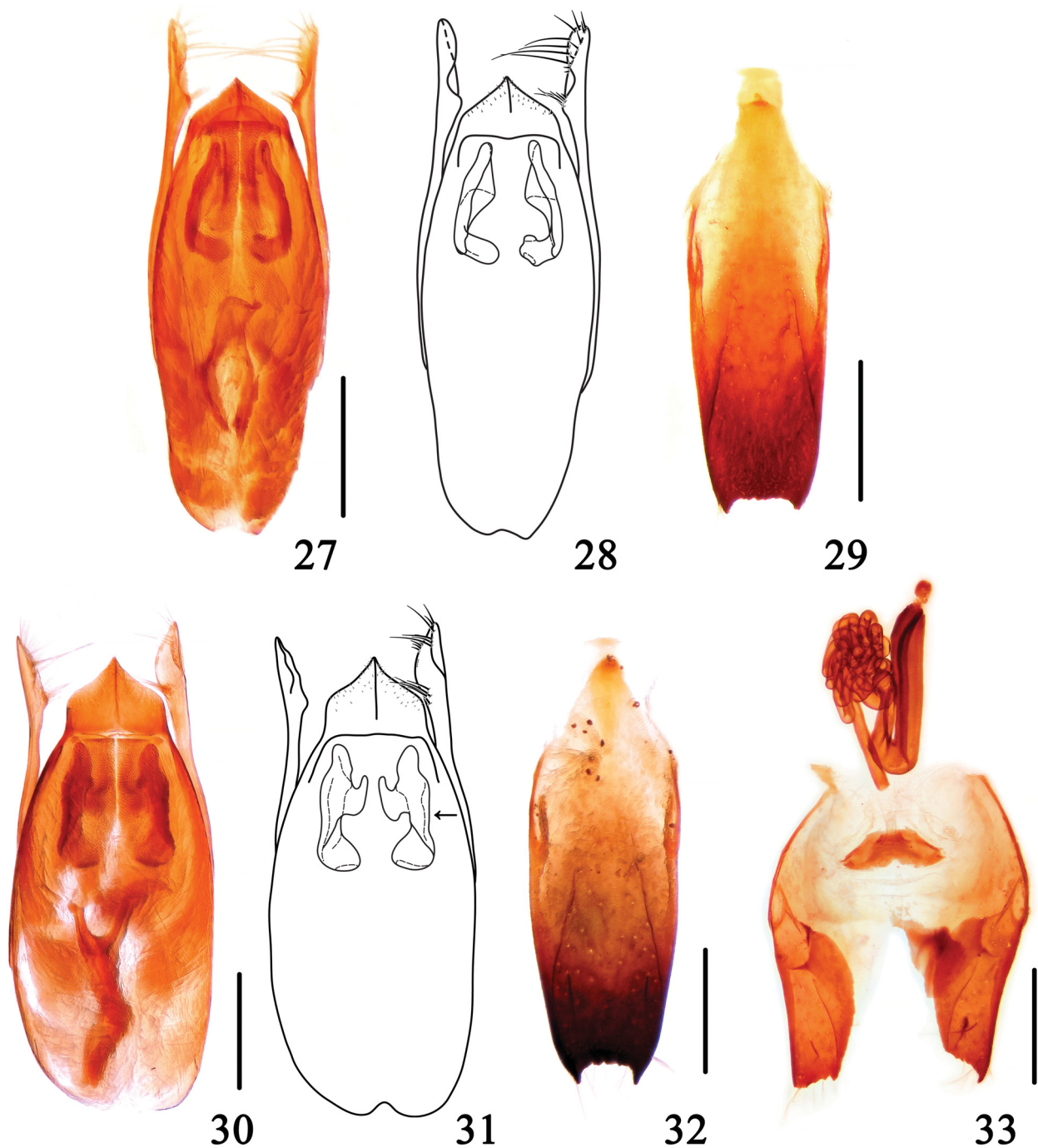
Figs 19–26. Sexual characters. 19–21 – *Stenus musicola* Cameron, 1930; 22 – *S. nigraeolus* Ryvkin, 2003; 23–26 – *S. mendaensis* sp. nov. 19, 20, 23, 24 – aedeagus; 21, 25 – male sternite IX; 22, 26 – spermatheca. Scale bars = 0.25 mm.

**Head** 0.98–1.00 times as wide as elytra; interocular area with two deep longitudinal furrows, median portion convex, extending a little beneath level of inner eye margins; punctures mostly round and more or less confluent, varied in size, diameter of large punctures slightly narrower than apical cross section of antennal segment II; interstices partially and indistinctly microsculptured, distinctly narrower than half the diameter of punctures. Paraglossa oval.

**Pronotum** 0.93–0.97 times as long as wide; disk uneven, with median longitudinal furrow broad and deep, which is about 4/5 as long as pronotum, a transverse impression near

anterior margin and two impressions near posterior margin; punctures confluent and somewhat irregular, similar size to those of head; interstices indistinctly microsculptured and rugae-like, narrower than half the diameter of punctures except for those in actual middle of longitudinal furrow, which could be slightly wider than diameter of punctures and distinctly reticulated.

**Elytra** 0.80–0.85 times as long as wide; disk relatively even, with indistinct humeral impression, indistinct postero-lateral impression and shallow sutural impression; punctures and interstices similar to those of pronotum but



Figs 27–33. Sexual characters. 27–29 – *Stenus aduncus* sp. nov.; 30–33 – *S. platydentatus* sp. nov. 27, 28, 30, 31 – aedeagus; 29, 32 – male sternite IX; 33 – spermatheca. Scale bars = 0.25 mm.

a little larger in size. Hind wings very short and nonfunctional, a little shorter than half the elytra.

**Legs.** Hind legs with tarsomeres IV shallowly emarginated on apical margin.

**Abdomen** subcylindrical; segments III–VI with broad paratergites, those of tergite 4 as broad as metatibiae at apex, tergite VII without apical membranous fringe; punctures elliptic, becoming slightly smaller posteriad; interstices indistinctly reticulated in tergite III, gradually becoming distinct in following tergites, interstices narrower than half the diameter of punctures on basal four tergites.

**Male.** Mesotibiae and metatibiae each with tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 25) with long apicolateral projections, posterior margin serrate. Aedeagus (Figs 23, 24) slender; apical sclerotized area of median lobe subtriangular with pointed tip; expulsion clasps large, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 11–12 setae in distal and 5–6 setae in basal group.

**Female.** Sternite VIII prominent in middle of posterior margin; spermatheca (Fig. 26) with basal porch sclerotized.



zed, spermathecal duct strongly sclerotized and coiled, capsule small.

**Etymology.** The specific name is derived from the type locality of this species; adjective.

**Distribution.** China (Qinghai), only known from the type locality.

***Stenus aduncus* sp. nov.**

(Figs 6, 27–29)

**Type material.** HOLOTYPE: CHINA: SICHUAN: ♂, glued on a card with labels as follows: “Jiajinshan, Jintang, 3550–3650 m, 18km E primary coniferous forest, 11–24.vi.2004, R. Fabbri leg.”, “Holotype / *Stenus aduncus* / Shuai, Tang & Luo” [red handwritten label] (MSBG).

**Differential diagnosis.** The new species resembles *S. platydentatus* sp. nov., *S. tenuidentatus* sp. nov. and *S. alpigenus* sp. nov. from Yunnan in general habitus but can be distinguished from all of them by apical sclerotized area of the median lobe shorter and expulsion clasps (Fig. 28) less protruded inwards medially.

**Description. Measurements.** BL: 4.2 mm, FL: 2.2 mm, HW: 0.84 mm, PL: 0.65 mm, PW: 0.70 mm, EL: 0.70 mm, EW: 0.87 mm, SL: 0.56 mm. Head 0.96 times as wide as elytra; pronotum 0.92 times as long as wide; elytra 0.81 times as long as wide.

**Morphology.** The species is similar to *Stenus mendanensis* sp. nov. in most aspects except for the following characters: head with interstices smooth, about 1–1.5 times as wide as diameter of punctures along midline of median convex portion; pronotum with impressions deeper, interstices almost smooth, rarely with traces of microsculpture, actual middle of longitudinal furrow densely punctate, which is similar to remaining portions of pronotum; emargination of hind tarsomeres IV deeper.

**Male.** Mesotibiae and metatibiae each with tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 29) with distinct apicolateral projections, posterior margin serrate. Aedeagus (Figs 27, 28) slender; apical sclerotized area of median lobe relatively short with pointed tip; expulsion clasps strongly sclerotized, weakly protruded inwards medially; copulatory tube broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 14–15 setae in distal and 6–7 setae in basal group.

**Female.** Unknown.

**Etymology.** The specific name is derived from the hook-shaped expulsion clasps of aedeagus; adjective.

**Distribution.** China (Sichuan).

***Stenus platydentatus* sp. nov.**

(Figs 7, 30–33)

**Type material.** HOLOTYPE: CHINA: YUNNAN: ♂, glued on a card with labels as follows: “Zhongdian Co., pass 28km ESE Zhongdian, devastated primary forest with young Abies, Larix, Belula, Rhodod, 27°43.9'N, 99°58.2'E, 3700–3750 m, 22.viii.2003, M. Schülke leg.”, “Holotype / *Stenus platydentatus* / Shuai, Tang & Luo” [red handwritten label] (MSBG). PARATYPES: CHINA: YUNNAN: 2 ♀♀, same label data as for the holotype (MSBG); 1 ♀, Zhongdian Co., pass 28km ESE Zhongdian, 3700–3750 m, 27°43.9'N, 99°58.2'E, 22.viii.2003, A. Smetana leg. (ASTJ); 1 ♀, Zhongdian Co., 36km ESE Zhongdian, 3500–3550 m, 27°40.9'N, 100°01.5'E,

23.viii.2003, A. Smetana leg. (ASTJ); 1 ♀, Zhongdian Co., 36km ESE Zhongdian, overgrown rock hillside with old mixed forest, bamboo, dead wood, mushrooms, 3500–3550 m, 27°40.9'N, 100°01.5'E, 23.viii.2003, M. Schülke leg. (MSBG); 1 ♀, Zhongdian Co., Bitai Hai Lake area, 29km ESE Zhongdian, 3540 m, 27°43.65'N, 99°58.97'E, creek valley, devastated mixed forest, litter, moss, dead wood, 1.vi.2005, M. Schülke leg. (MSBG); 1 ♂ 1 ♀, Zhongdian Co., 35km ESE Zhongdian, 3450 m, 27°41.00'N, 100°01.47'E, devastated mixed forest near small creek, sifted from litter, moss, dead wood, 3.vi.2005, M. Schülke leg. (SHNU).

**Differential diagnosis.** The new species resembles *S. tenuidentatus* sp. nov. and *S. alpigenus* sp. nov. from Yunnan but can be distinguished from them by stout aedeagal expulsion clasps (Fig. 31) and slender spermatheca (Fig. 33).

**Description. Measurements.** BL: 4.1–5.1 mm, FL: 2.2–2.4 mm, HW: 0.93–1.02 mm, PL: 0.71–0.84 mm, PW: 0.79–0.88 mm, EL: 0.85–0.93 mm, EW: 1.02–1.15 mm, SL: 0.62–0.76 mm. Head 0.89–0.96 times as wide as elytra; pronotum 0.90–0.97 times as long as wide; elytra 0.79–0.87 times as long as wide.

**Morphology.** The species is similar to *Stenus mendanensis* sp. nov. in most aspects except for the following characters: head with interstices smooth; pronotum with impressions deeper, interstices partially reticulated, distinct in the actual middle of longitudinal furrow, actual middle of longitudinal furrow densely punctate, which is similar to remaining portions of pronotum; abdominal tergites III–VII with interstices smooth.

**Male.** Mesotibiae and metatibiae each with tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 32) with distinct apicolateral projections, posterior margin serrate. Aedeagus (Figs 30, 31) robust; apical sclerotized area of median lobe medium in length and pointed at tip; expulsion clasps stout, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 15–17 setae in distal and 5–7 setae in basal group.

**Female.** Sternite VIII prominent in middle of posterior margin; spermatheca (Fig. 33) with basal porch slightly emarginated on apical margin, spermatheca duct strongly sclerotized and coiled at the first bend, capsule small.

**Etymology.** The species name is derived from the broad expulsion clasps of aedeagus; adjective.

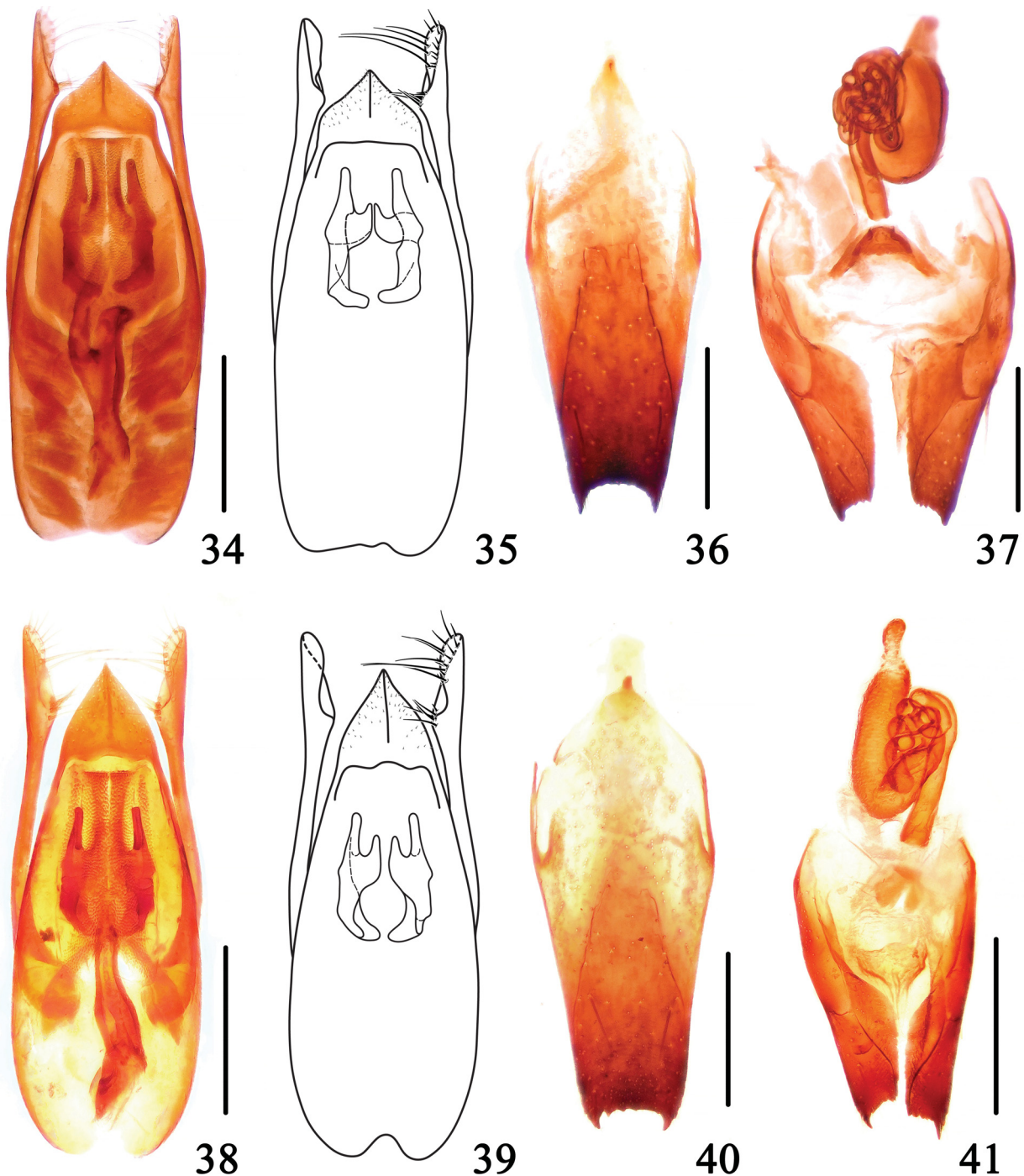
**Distribution.** China (Yunnan).

***Stenus tenuidentatus* sp. nov.**

(Figs 8, 34–37)

**Type material.** HOLOTYPE: CHINA: YUNNAN: ♂, glued on a card with labels as follows: “Xue Shan nr. Zhongdian, 3800 m, 27°49'N, 99°34'E, 26.iv.1996, A. Smetana, J. Farkač & P. Kabátek leg.”, “Holotype / *Stenus tenuidentatus* / Shuai, Tang & Luo” [red handwritten label] (ASTJ). PARATYPES: CHINA: YUNNAN: 1 ♂ 7 ♀♀, same label data as for the holotype (ASTJ, SHNU); 1 ♂, Zhongdian Co., 10 km SW Zhongdian, Xue Shan, 3800 m, 27°46.5'N, 99°36.5'E, 20.viii.2003, A. Smetana leg. (SHNU).

**Differential diagnosis.** The new species resembles *S. platydentatus* sp. nov. and *S. alpigenus* sp. nov. from Yunnan but can be distinguished from them by slender aedeagal expulsion clasps (Fig. 35) and the spermatheca duct stout, strongly coiled at first bend (Fig. 37).



Figs 34–41. Sexual characters. 34–37 – *Stenus tenuidentatus* sp. nov.; 38–41 – *S. paratrigonuroides* sp. nov. 34, 35, 38, 39 – aedeagus; 36, 40 – male sternite IX; 37, 41 – spermatheca. Scale bars = 0.25 mm.

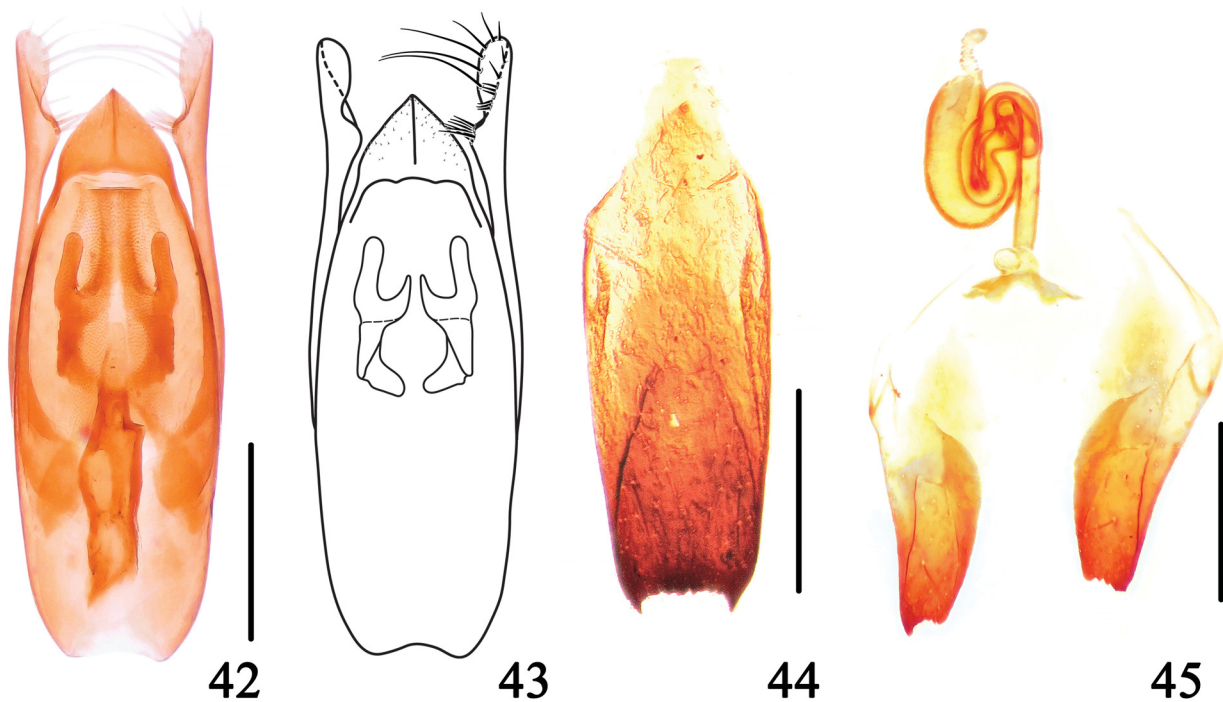
**Description. Measurements.** BL: 4.1–4.8 mm, FL: 1.9–2.4 mm. HW: 0.82–0.93 mm, PL: 0.65–0.71 mm, PW: 0.71–0.79 mm, EL: 0.71–0.81 mm, EW: 0.88–0.98 mm, SL: 0.56–0.63 mm. Head 0.89–0.97 times as wide as elytra; pronotum 0.86–0.96 times as long as wide; elytra 0.77–0.84 times as long as wide.

**Morphology.** The species is similar to *Stenus mendensis* sp. nov. in most aspects except for the following characters: head with interstices smooth, interstices along midline of median convex portion very variable in different individuals, varied from distinctly smaller than half the diameter of punctures to distinctly larger than diameter of

punctures; hind wings minute, nearly invisible; abdominal tergites III–VII with interstices smooth.

**Male.** Mesotibiae and metatibiae each with tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 36) with distinct apicolateral projections, posterior margin serrate. Aedeagus (Figs 34, 35) stout; apical sclerotized area of median lobe medium in length and pointed at tip; expulsion clasps slender, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 14 setae in distal and 6–8 setae in basal group.





Figs 42–45. Sexual characters. *Stenus alpigenus* sp. nov. 42, 43 – aedeagus; 44 – male sternite IX; 45 – spermatheca. Scale bars = 0.25 mm.

**Female.** Sternite VIII prominent in middle of posterior margin; spermatheca (Fig. 37) strongly sclerotized, basal porch distinctly emarginated on apical margin, spermatheca duct stout, strongly coiled at first bend, capsule small.

**Etymology.** The specific name is derived from the slender expulsion clasps of aedeagus; adjective.

**Distribution.** China (Yunnan).

***Stenus paratrignuroides* sp. nov.**

(Figs 9, 38–41)

**Type material.** HOLOTYPE: CHINA: YUNNAN: ♂, glued on a card with labels as follows: “NW Deqen, Baima Xue Shan, 28.20°N, 99.03°E, 4000–4300 m, conif, Rhodod, 16–20.vi.2016, Reuter leg.”, “Holotype / *Stenus paratrignuroides* / Shuai, Tang & Luo” [red handwritten label] (VPSG). PARATYPES: CHINA: YUNNAN: 2 ♂♂ 3 ♀♀, same label data as for the holotype (VPSG, SHNU); 1 ♀, Deqin Co., Baima Shan, E-side, pass 12km SE Deqin, 28°23.86'N, 99°59.04'E, 4085 m, small creek valley *Rhododendron*, *Salix*, leaf litter, moss, dead wood sifted, 10.vi.2005, M. Schülke leg. (MSBG); 1 ♀, Deqin Co., Baima Shan, pass 15km SE Deqin, 28°22.68'N, 99°00.57'E, 4330 m, meadows, *Azalea*, *Juniperus*, leaf litter, grass, moss, sifted, 12.vi.2005, M. Schülke leg. (MSBG); 1 ♀, Deqin Co., Baima Shan, pass 15km SE Deqin, 28°22.68'N, 99°00.57'E, 4330 m, 12.vi.2005, A. Smetana leg. (ASTJ).

**Differential diagnosis.** The new species resembles *S. trigonuroides* from West China and *S. aureolus* from the Far East but can be distinguished from both by longer apical sclerotized area of the aedeagal median lobe (Fig. 39) and short hind wings. It also differs from *S. aureolus* (Fig. 14) in the coiled spermatheca duct (Fig. 41). See also Differential diagnoses of these species.

**Description. Measurements.** BL: 3.8–4.5 mm, FL: 2.0–2.3 mm, HW: 0.81–0.87 mm, PL: 0.61–0.68 mm, PW: 0.65–0.73 mm, EL: 0.79–0.86 mm, EW: 0.85–0.93 mm, SL: 0.66–0.76 mm. Head 0.91–0.98 times as wide as elytra; pronotum 0.91–0.99 times as long as wide; elytra 0.90–0.97 times as long as wide.

**Morphology.** The species is similar to *Stenus mendaensis* sp. nov. in most aspects except for the following characters: head with interstices smooth, interstice in middle of midline of median convex portion slightly larger than diameter of punctures; hind wings slightly longer, about half the length of elytra; abdominal tergite VII with apical membranous fringe; abdominal tergites III–VI with interstices smooth.

**Male.** Mesotibiae and metatibiae each with tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 40) with distinct apicolateral projections, posterior margin serrate. Aedeagus (Figs 38, 39) slender; apical sclerotized area of median lobe long and pointed at tip; expulsion clasps slender, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 14–18 setae in distal and 6 setae in basal group.

**Female.** Sternite VIII prominent in middle of posterior margin; spermatheca (Fig. 41) sclerotized with basal porch bilobed, spermatheca duct coiled at first bend, capsule small.

**Etymology.** The species name refers to the striking similarity of this species with *S. trigonuroides*; the suffix *-oides* (same for all genders) means ‘resembling’.

**Distribution.** China (Yunnan).

***Stenus alpigenus* sp. nov.**

(Figs 10, 42–45)

**Type material.** HOLOTYPE: CHINA: YUNNAN: ♂, glued on a card with labels as follows: “Zhongdian Co., 55km N Zhongdian, 28°19.8'N, 99°45.7'E, 3800m, primary mixed forest, Rhodod, dead wood, mushrooms, moss, 18.viii.2003, M. Schülke leg.”, “Holotype / *Stenus alpigenus* / Shuai, Tang & Luo” [red handwritten label] (MSBG). PARATYPES: CHINA: YUNNAN: 2 ♂♂ 2 ♀♀, same label data as for the holotype (MSBG, SHNU).

**Differential diagnosis.** The new species resembles *S. tenuidentatus* sp. nov. and *S. platydentatus* sp. nov. from Yunnan but can be distinguished from both by narrower apical sclerotized area of aedeagal median lobe (Fig. 43) and less coiled spermatheca duct (Fig. 45).

**Description. Measurements.** BL: 3.4–4.4 mm, FL: 1.8–2.2 mm. HW: 0.81–0.90 mm, PL: 0.61–0.71 mm, PW: 0.64–0.76 mm, EL: 0.65–0.82 mm, EW: 0.78–0.97 mm, SL: 0.52–0.65 mm. Head 0.92–1.04 times as wide as elytra; pronotum 0.94–0.98 times as long as wide; elytra 0.84–0.88 times as long as wide.

**Morphology.** The species is similar to *Stenus mendaensis* sp. nov. in most aspects except for the following characters: head with interstices smooth, interstices along midline of convex portion slightly larger than half the diameters; elytral punctuation more confluent; abdominal tergites with punctuation slightly coarser, tergites III–VII with interstices smooth.

**Male.** Mesotibiae and metatibiae each with tooth on inner side of apex; sternite VIII with triangular emargination in middle of posterior margin; sternite IX (Fig. 44) with distinct apicolateral projections, posterior margin serrate. Aedeagus (Figs 42, 43) slender; apical sclerotized area of median lobe relatively long and pointed at tip; expulsion clasps relatively stout, strongly sclerotized; copulatory tube long and broad; parameres much longer than median lobe, swollen in apical parts, each with two groups of setae on apico-internal margins: 14–15 setae in distal and 5–7 setae in basal group.

**Female.** Sternite VIII prominent in middle of posterior margin; spermatheca (Fig. 45) sclerotized, basal porch emarginated on apical margin, spermatheca duct stout, coiled at first bend, capsule small.

**Etymology.** The specific name is derived from the high altitude of the type locality; adjective.

**Distribution.** China (Yunnan).

### Key to species of the *Stenus aureolus* group from China

- 1 Abdominal tergite VII with apical membranous fringe; elytra longer with EL/EW = 0.90–1.09, macropterous or brachypterous species. .... 2
  - Abdominal tergite VII without apical membranous fringe; elytra shorter with EL/EW = 0.77–0.88, brachypterous species. .... 5
- 2 Relatively smaller species with FL = 1.8–2.3 mm; hind tarsi with segments IV shortly but distinctly bilobed; elytra shorter with EL/EW = 0.90–1.02. The species should be best identified by examining male and female genitalia. .... 3
  - Relatively larger species with FL = 2.3–2.6 mm; hind tarsi with segments IV indistinctly emarginated on apical margin; elytra longer with EL/EW = 1.02–1.09. Habitus: Fig. 3; aedeagus: Fig. 19; spermatheca unknown. Yunnan, Qinghai. .... *S. musicola* Cameron, 1930
- 3 Apical sclerotized area of aedeagal median lobe relatively longer (Figs 15, 38); spermatheca tube very coiled at the first bend (Figs 18, 41). .... 4
  - Apical sclerotized area of aedeagal median lobe relatively shorter; spermatheca tube simple at first bend. BL: 3.5–4.2 mm. Habitus: Fig. 1; sexual characters: Figs 11–14. Heilongjiang, Jilin, Neimenggu. .... *S. aureolus* Fauvel, 1875
- 4 HW/EW = 0.83–0.96; apical sclerotized area of aedeagal median lobe relatively broader and shorter; hind wings longer, 1.88–3.19 times as long as elytra. BL: 3.4–4.5 mm. Habitus: Fig. 2; sexual characters: Figs 15–18. Sichuan, Yunnan, Ningxia, Shaanxi, Qinghai. .... *S. trigonuroides* Zheng, 1993

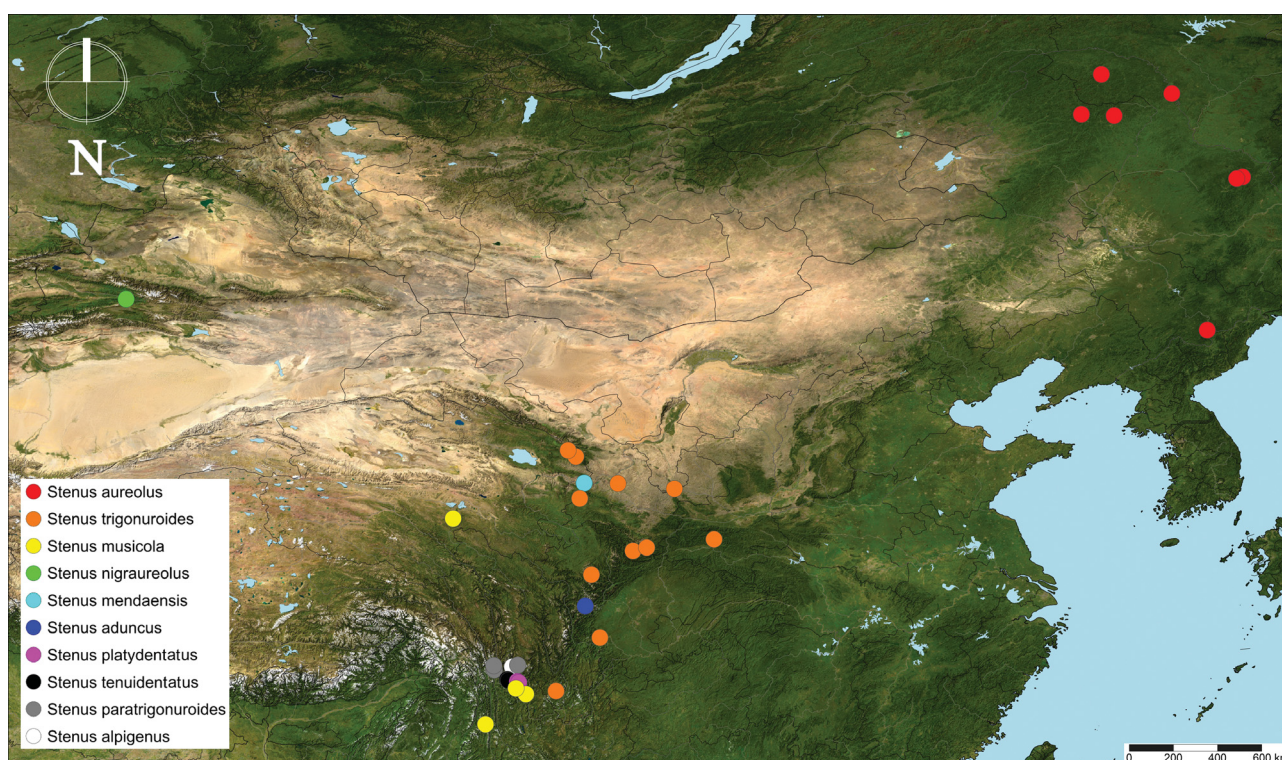


Fig. 46. The distribution of the species of the *Stenus aureolus* group in China.



- HW/EW = 0.91–0.98; apical sclerotized area of aedeagal median lobe relatively narrower and longer; hind wings shorter, slightly longer than half the elytra. BL: 3.8–4.5 mm. Habitus: Fig. 9; sexual characters: Figs 38–41. Yunnan. .... ***S. paratrigonuroides* sp. nov.**
- 5 Head and pronotum with interstices distinctly reticulated. Habitus: Fig. 4; sexual characters: Figs 22. Xinjiang. .... ***S. nigraureolus* Ryvkin, 2003**
- Head and pronotum with interstices smooth or at most indistinctly and partially reticulated. .... 6
- 6 Smaller species with FL: 1.6–1.7 mm; hind tarsi with segments IV indistinctly emarginated on apical margin. BL: 3.5–3.7 mm. Habitus: Fig. 5; sexual characters: Figs 23–26. Qinghai. .... ***S. mendaensis* sp. nov.**
- Larger species with FL: 1.8–2.4 mm; hind tarsi with segments IV shortly but distinctly bilobed. The species should be identified by genitalia dissections. .... 7
- 7 Apical sclerotized area of aedeagal median lobe short, expulsion clasps (Fig. 28) less protruded inwards medially. Habitus: Fig. 6; sexual characters: Figs 27–29. Sichuan. .... ***S. aduncus* sp. nov.**
- Apical sclerotized area of aedeagal median lobe long, expulsion clasps more protruded inwards medially (Fig. 30). .... 8
- 8 Aedeagus with expulsion clasps stout; spermatheca (Fig. 33) with basal porch less emarginated on apical margin, and spermatheca duct slender. Habitus: Fig. 7; sexual characters: Figs 30–33. Yunnan. .... ***S. platydentatus* sp. nov.**
- Aedeagus with expulsion clasps slender; spermatheca with basal porch more emarginated on apical margin and spermatheca duct stout. .... 9
- 9 Apical sclerotized area of aedeagal median lobe relatively short and wide, expulsion clasps slender in apical half; spermatheca duct (Fig. 37) more coiled at first bend. Habitus: Fig. 8; sexual characters: Figs 34–37. Yunnan. .... ***S. tenuidentatus* sp. nov.**
- Apical sclerotized area of aedeagal median lobe relatively long and narrow, expulsion clasps stout in apical half; spermatheca duct (Fig. 45) less coiled at first bend. Habitus: Fig. 10; sexual characters: Figs 42–45. Yunnan. .... ***S. alpigenus* sp. nov.**

## Acknowledgments

We express our sincere gratitude to Dr. Martin Fikáček (Czech Republic) for greatly improving the manuscript, to Dr. V. Puthz (Germany) for his constant guidance in our studies of Chinese Steninae, and to all the collectors. This research was supported by the National Natural Science Foundation of China (No. 31672252).

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