

ORIGINAL ARTICLE

Thrinchostoma Saussure, little known bee genus from China, with description of a new species (Hymenoptera: Halictidae)

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Abstract The bee genus *Thrinchostoma* Saussure, 1890 is reported from China with a new species and a new record species, *T. (Thrinchostoma) yunnanense* Niu & Zhu, **sp. nov.** and *T. (T.) sladeni* Cockerell, 1913. An illustrated key to the two Chinese species of the subgenus *Thrinchostoma* (*T.*) is provided. The type specimens are deposited in Institute of Zoology, Chinese Academy of Sciences, Beijing, China.

Key words Apoidea, Apiformes, taxonomy, Xishuangbanna.

1 Introduction

The genus *Thrinchostoma* was erected by Saussure in 1890. The body of *Thrinchostoma* species is relatively long (body length: 8–16 mm); the clypeus strongly produced downward and strongly protuberant forward; the malar area distinct but variable, from less than one-third as long as wide to four times as long as wide, and as long as or longer than the eye length; the paraocular lobe strongly produced down into the clypeus; both of the recurrent veins usually entering the third submarginal cell; the hind tibial spur of the female finely to coarsely serrate or the margin almost undulate; the hind tibia of the male with a broad yellowish enlargement that carries the tibial spurs; S4 of the male is usually shortened, largely hidden by S3, but the lateral parts extending posteriorly on either side of a broad concavity; the dorsal gonostylus large and rather elaborate, the ventral gonostylus erect or retrorse (Michener, 2007).

The distinct halictine genus occurs in Africa, Madagascar, and tropical Asia and nearby islands (Michener, 2007). The 56 known species of *Thrinchostoma* from different regions of the world were reviewed by several authors, including Blüthgen (1926, 1928, 1931, Asiatic species; 1930, 1933, African and Malagasy species), Pauly *et al.* (2001, Madagascar species), Michener & Engel (2010, Southern Asiatic species), Pauly & Eardley (2013, African species). Blüthgen (1930) divided the genus into three subgenera. Michener (1978) and Pauly (1999) listed relevant various species of the genus *Thrinchostoma* for the world, respectively. The malar area is nearly as long as or longer than the eye length in the subgenus *T. (Diagonozus)* Enderlein, 1903. In the subgenera *T. (Eothrinchostoma)* Blüthgen, 1930 and *T. (Thrinchostoma)* Saussure, the malar area does not exceed one quarter of the eye length. Males of the subgenus *T. (Thrinchostoma)* have a peculiar spot of dense hairs along the second submarginal crossvein of the forewing.

China stretches over the Palearctic and Oriental Regions. Considering of its size as well as the geographical and climatic diversity, the Chinese halictid fauna is very abundant, with about 13 genera and 291 species currently recorded so far (Ascher & Pickering, 2014). But the species of the genus *Thrinchostoma* has so far not been reported from China, except Zhong *et al.* (2014) recorded that *Thrinchostoma* sp. was one of pollinators of *Impatiens hainanensis*. By

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Figures 1–6. *Thrinchostoma (T.) sladeni* Cockerell, 1913, male. 1. Habitus, lateral view. 2. Head, frontal view. 3. Head, lateral view. 4. Metasoma, dorsal view, showing T1–2. 5. Metasoma, ventral view. 6. Hind leg, lateral view, showing the trochanter, femur and tibia. Scale bars= 1 mm.

examination of specimens collected from the Naban River Watershed National Nature Reserve (NWNR), located in Xishuangbanna of Yunnan Province, we found two species of *Thrinchostoma (T.)* for the first time in China. In this paper, a key to the two known Chinese species of *Thrinchostoma (T.)* is presented.

2 Materials and methods

Most specimens examined are deposited in the Insect Collection of Institute of Zoology, Chinese Academy of Sciences (IZCAS), Beijing, China. The specimens were examined with a NIKON SMZ 1500 stereomicroscope. Attributes were recorded with a NIKON D7000 digital camera and Helicon Focus software. The terminology used in the description follows Michener (2007) for general morphology. Absolute measurements, in millimeters (mm), are used for length of body. For all other structures, relative measurements are used.

Some abbreviations used in description mainly follow Niu *et al.* (2013) as follows:

BL—body length, measured from the base of the antennal socket to the apex of the metasoma;

HL—head length, measured from the apicomedian margin of the clypeus to the upper margin of the vertex in frontal view;

HW—head width, measured at the widest point of the head across the compound eyes in frontal view;

EW—eye width, the greatest width of eye in lateral view;

GW—genal width, the greatest width of the gena in lateral view;

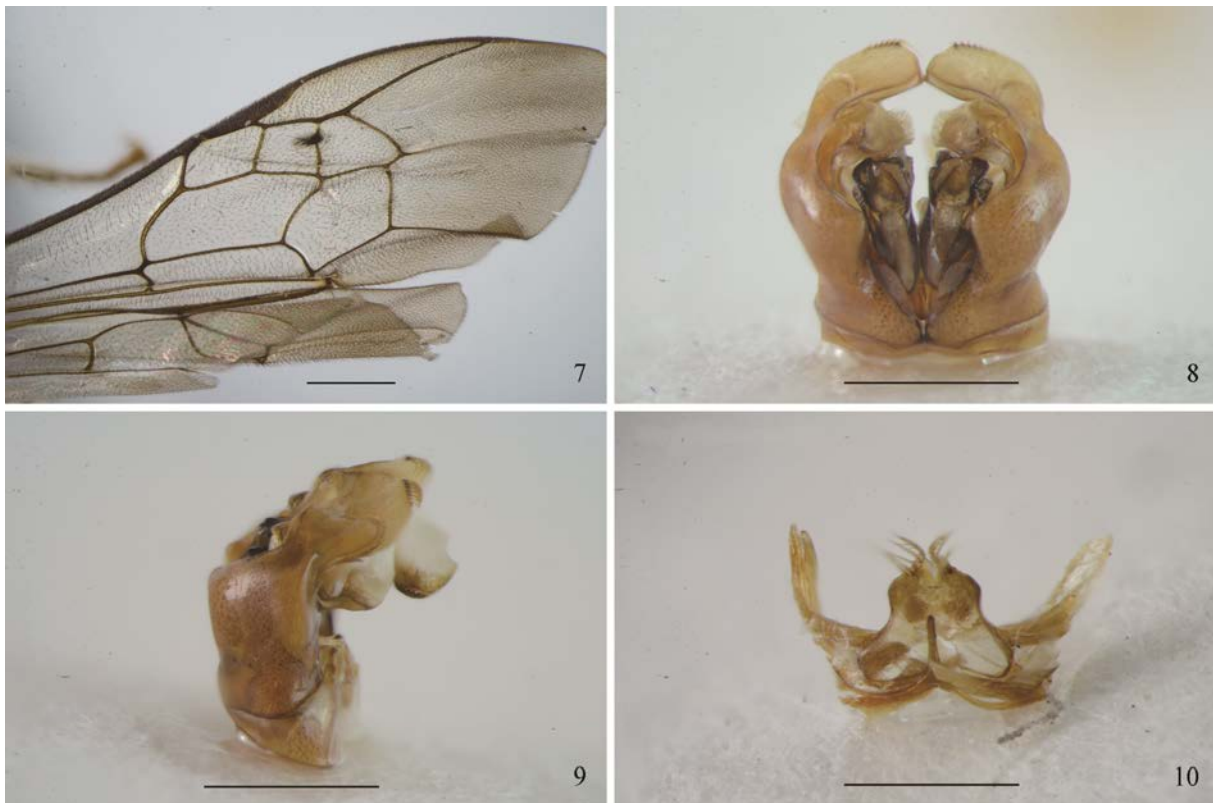
T1, T2 *etc.* —first, second, *etc.* metasomal terga;

S1, S2, *etc.* —first, second, *etc.* metasomal sterna.

3 Systematics

Key to Chinese known species of *Thrinchostoma* (*Thrinchostoma*).

1. Flagellum 11-segmented, male 2
 Flagellum 10-segmented, female 3
2. Malar area nearly as long as the width of mandible base (Fig. 3); trochanter of hind leg ventrally with angular projection (Fig. 6); second marginal crossvein reaching the radial nervure (Fig. 7) *Thrinchostoma* (*T.*) *sladeni* Cockerell, 1913
 Malar area longer than the width of mandible base (Fig. 19); trochanter of hind leg ventrally normal, without angular projection (Fig. 22); second marginal crossvein not reaching the radial nervure (Fig. 23) *Thrinchostoma* (*T.*) *yunnanense* Niu & Zhu, sp. nov.
3. Malar area about one-third as long as the width of mandible base (Fig. 13); second marginal crossvein angulated medially (Fig. 14); apical one-third part of clypeus yellowish-brown, other part of clypeus black (Fig. 12); T2 with broad orange apical margin (Fig. 15) *Thrinchostoma* (*T.*) *sladeni* Cockerell, 1913
 Malar area longer than the width of mandible base (Fig. 29); second marginal crossvein straight medially (Fig. 30); whole clypeus dust yellow (Fig. 28); T2 without broad orange apical margin (Fig. 31) *Thrinchostoma* (*T.*) *yunnanense* Niu & Zhu, sp. nov.



Figures 7–10. *Thrinchostoma* (*T.*) *sladeni* Cockerell, 1913, male. 7. Fore wing, dorsal view, showing second submarginal crossvein and the hair spot. 8. Genitalia, dorsal view. 9. Genitalia, lateral view. 10. S7–8, ventral view. Scale bars = 1 mm.

***Thrinchostoma (T.) sladeni* Cockerell, 1913 New record to China (Figs 1–16)**

Thrinchostoma sladeni Cockerell, 1913: 35, ♂ (non. ♀). Type locality: India, Assam, Khasia Hills.

Halictus wroughtoni Bingham, 1897 (nec Cameron, 1897): 432, ♂, ♀, not examined.

Halictus (Rostratilapis) sladeni Friese 1914: 27, ♂ (non. ♀).

Thrinchostoma sladeni Cockerell: Sladen, 1915: 213, ♂; Blüthgen, 1926: 377, ♂, ♀.

Thrinchostoma (T.) sladeni Cockerell: Michener, 1978: 524 (list); Michener & Engel, 2010: 133 (list), 131, ♀ (key), 133, ♂ (key); Saini & Rathor, 2012: 164 (list).

Diagnosis. All specimens collected from China bear the following characters: the male malar area nearly as long as the width of mandible base (Fig. 3), metafemur, metatibia strongly swollen, and metatrochanter ventrally with angular projection (Fig. 6), basal margin of S5 with two transverse rows of spines numbered in 3 respectively at both sides (Fig. 5); the female malar area about one-third as long as the width of mandible base (Fig. 13), second marginal crossvein angulated medially (Fig. 14), metasomal terga with short, simple, laterally-directed hairs on posterior marginal zones, T2 with broad orange apical margin (Fig. 15). All these characters diagnosed our specimens as *T. (T.) sladeni* Cockerell, 1913.



Figures 11–16. *Thrinchostoma (T.) sladeni* Cockerell, 1913, female. 11. Habitus, lateral view. 12. Head, frontal view. 13. Head, lateral view. 14. Fore wing, dorsal view, showing second submarginal crossvein angulated medially. 15. Metasoma, dorsal view, showing T1–2. 16. Hind tibia, showing the inner tibial spur. Scale bars = 1 mm.

Materials examined. China, Yunnan, Xishuangbanna, NWR: Naban (100°40'E, 22°09'N), 1♀1♂, 12.V.2008, 1♀, 729 m, 6.IV.2009, 2♀, 709 m, 26.IV.2009, 1♀, 732 m, 26.V.2009, coll. Lingzeng Meng; 2♀, 729 m, 2♀, 732 m, 23.V.2008, 2♀, 729 m, 6.VI.2008, 1♀1♂, 709 m, 15.VI.2008, 1♀, 729 m, 28.VI.2008, 3♀, 732 m, 18.VII.2008, coll. A. Weigel; Mandian (100°40'E, 22°07'N), 1♀, 753 m, 6.VI.2008, 1♀, 753 m, 15.VI.2008, 2♀, 28.VI.2008, 2♀, 753 m, 8.VII.2008, coll. A. Weigel; 2♀, 753 m, 16.III.2009, 2♀, 753 m, 6.IV.2009, 1♀, 746 m, 16.IV.2009, 2♀, 746 m, 6.V.2009, 4♀, 753 m, 16.V.2009, 4♀, 753 m, 6.VI.2009, 2♀, 2♂, 26.VI.2009, coll. Lingzeng Meng; Anma Xinzai (100°39'E, 22°12'N), 4♀, 772 m, 6.IV.2009, 1♀, 772 m, 26.V.2009, coll. Lingzeng Meng; 1♀, 13.VI.2013, coll. Pia Oremek; Danuoyou (100°38'E, 22°12'N), 1♀, 770 m, 26.V.2009, coll. Lingzeng Meng; 1♀, 1.V.2013, 1♀, 10.VII.2013, coll. Pia Oremek; Jinhong Mekong Hill Garden (100°47'E, 22°01'N), 1♀, 30.XII.2007, coll. A. Weigel; Banggang Xinzai (100°15'E, 22°09'N), 1♀, 12.V.2008, coll. Lingzeng Meng; Manfei (100°40'E, 22°08'N), 1♀, 14.V.2013, 1♀, 29.VI.2013, coll. Pia Oremek; Xiaomangmu (100°28'E, 22°00'N), 1♂, 29.V.1987, (*Alpinia* sp.), coll. Tao Zhu; Juzidi (100°37'E, 22°13'N), 1♀, 30.IV.2013, 1♂, 11.VI.2013, 1♀, 25.VI.2013, coll. Pia Oremek; China, Yunnan, Xishuangbanna, Mile Xian, Bubang (103°14'E, 24°07'N), 1♂, 700 m, 16.IX.1993, coll. Huanli Xu.

Distribution. China (Yunnan), India (Assam, Khasia Hills; Cockerell, 1913).



Figures 17–22. *Thrinchostoma (T.) yunnanense* Niu & Zhu, **sp. nov.**, male. 17. Habitus, lateral view. 18. Head, frontal view. 19. Head, lateral view. 20. Metasoma, dorsal view, showing T1–2. 21. Metasoma, ventral view. 22. Hind leg, lateral view, showing the trochanter, femur and tibia. Scale bars = 1 mm.

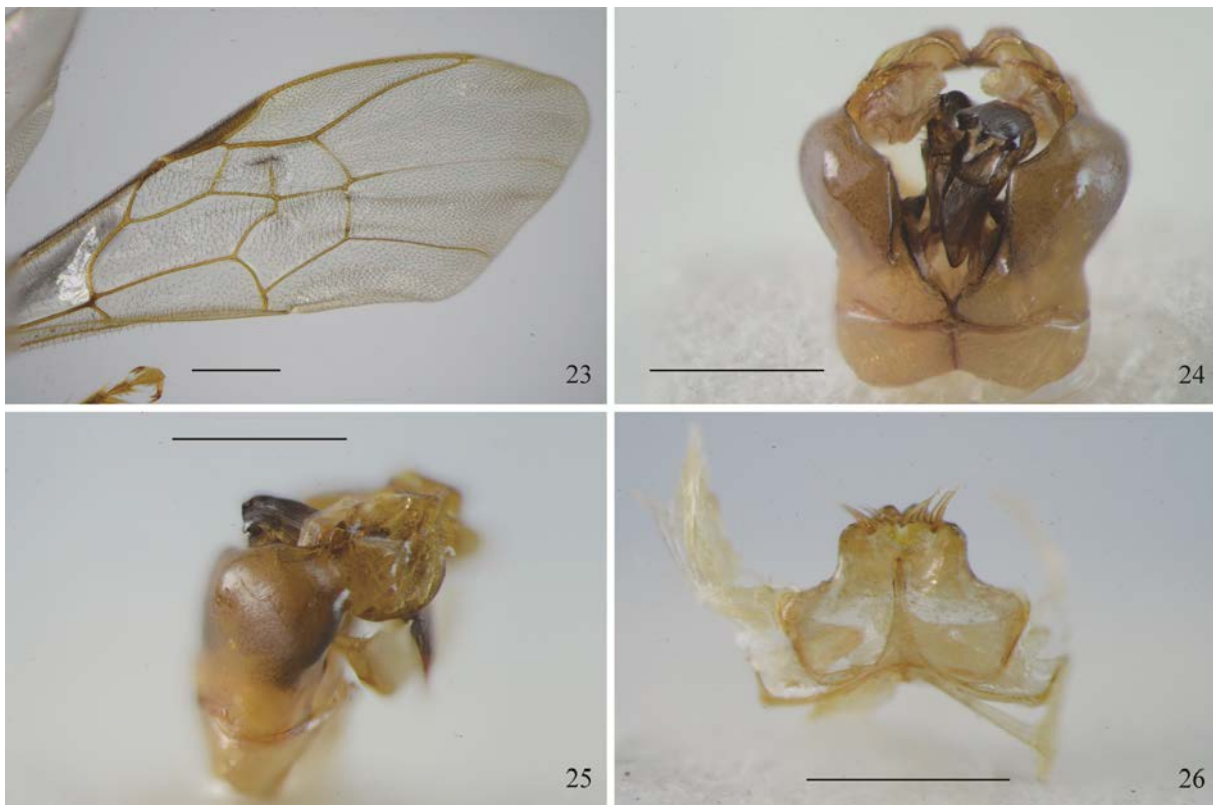
Floral association. *Alpinia* sp. (Zingiberaceae).

Remark. This species was previously only recorded from India in literature. It is a newly recorded species for China.

***Thrinchostoma (T.) yunnanense* Niu & Zhu, sp. nov.** (Figs 17–32)

Diagnosis. The new species is similar to *T. assamense* Sladen, 1915. The female can be distinguished from *T. assamense* by disc of T1 with very sparse and fine punctures, T2 without broad orange apical margin (Fig. 31); the male has two transverse rows of spines at basal margin of S5, and number 7 at left side and 6 at right side (Fig. 21).

Description. Male. BL=10.0mm (Fig. 17). Head obviously longer than broad, HL: HW=64: 49 (Fig. 18); antenna filiform, flagellum 11-segmented, first flagellomere nearly as long as broad, second to tenth flagellomeres about equal in length, each segment about 1.5 times as long as broad, last flagellomere nearly 2.5 times as long as broad, last flagellomere not bent; malar area near twice as long as the width of mandible base (12:6), and nearly one-third as long as eye length (12:35) (Fig. 19); gena narrower than eye, GW: EW=5: 20 (Fig. 19); forewing with a conspicuous dark spot of dense hairs near median part of second submarginal crossvein, and the second submarginal crossvein not reaching the radical nervure (Fig. 23); T1 and T2 polished, respectively with a transverse band (Fig. 20); S2 medioapically with a tong-like extension (Fig. 21); S4 shortened, largely hidden by S3; S5 with two transverse rows of spines at basal margin, number 7 at left side and 6 at right side, and the spines nearly equidistant and of equal length (Fig. 21); apical margin of S5 with setae and distinctly concave (Fig. 21); hind trochanter ventrally normal, without angular projection, hind femur weakly swollen, apical lobe of hind tibia blunt and large (Fig. 22); genitalia robust (Figs 24–25), gonobase twice wider than long, gonocoxite wide and polished, laterally no much deviating from gonobasal outline (Fig. 25), dorsal gonostylus massive elongate round-shape, upper apical margin with sparse and fine setae (Fig. 25), ventral gonostylus forming a retrorse massive round-shape lobe, arising from center of gonocoxite, and flexed medially, apically irregularly truncate, centrally and peripherally glabrous (Fig. 25); S7 (Fig. 26) with median part triangular, apically forming a slender and glabrous process; S8 (Fig. 26) trapezoid, forming a massive median converse trapezoid process with a few long bristles apically, medioapical margin with two little processes. Head black, except clypeus yellowish-brown with blackish-brown mark laterally (Figs 18–19); mesosoma black (Fig. 17), except pronotal lobe yellowish-brown; T1–2 pale yellowish-brown with



Figures 23–26. *Thrinchostoma (T.) yunnanense* Niu & Zhu, **sp. nov.**, male. 23. Fore wing, dorsal view, showing second submarginal crossvein and the hair spot. 24. Genitalia, dorsal view. 25. Genitalia, lateral view. 26. S7–8, ventral view. Scale bars = 1 mm.



Figures 27–32. *Thrinchostoma (T.) yunnanense* Niu & Zhu, **sp. nov.**, female. 27. Habitus, lateral view. 28. Head, frontal view. 29. Head, lateral view. 30. Fore wing, dorsal view, showing second submarginal crossvein straight medially. 31. Metasoma, dorsal view, showing T1–2. 32. Hind tibia, showing the inner tibial spur. Scale bars = 1 mm.

blackish-brow band (Fig. 20); S1–3 pale yellowish-brown, S5 blackish-brown, S6 black (Fig. 21); legs yellowish-brown, except coxae, out-surface of fore trochanteres and basal out-surface of fore femur (Figs 17, 20, 22). Vertex, low part of frontal area, malar area and genal area covered with short yellowish-white plumose pilosity (Figs 18–19); parts of mesosoma also covered with pale yellowish-white plumose hairs in different length.

Female. BL=10.5–13.0 mm (Fig. 27). Head obviously longer than broad, HL: HW=65: 56 (Fig. 28); antenna geniculate (Fig. 28), flagellum 10-segmented; malar area slightly longer than the width of mandible base (12:10), and about one-third as long as eye length (12:38) (Fig. 29); gena as broad as eye, GW: EW=14: 14 (Fig. 29); second submarginal crossvein straight, not angulated medially and reaching the radical nervure (Fig. 30); T1 polished, disc with microscopically very sparse and fine punctures, two round spots (Fig. 31); hind tibial spur coarsely serrate with the first teeth well-developed (Fig. 32). Clypeus, low part of paraocular lobe rust yellow (Fig. 28); supraclypeal area black (Fig. 28); basal part of mandible rust yellow, apical part reddish-black (Figs 28–29); scape reddish-brown (Fig. 28); terga black, except T1 yellowish-brown, and T2–4 without broad orange apical margin (Fig. 31); fore leg yellowish-brown (Fig. 28), hind leg blackish (Fig. 32). Vertex, low part of frontal area, malar area and genal area covered with short yellowish-white

plumose pilosity (Figs 28–29); sloping anterior surface of T1 covered with erect golden simple hairs (Fig. 31); T1–4 with yellowish-white laterally directed simple hairs on tergal apical marginal zones; hind femur covered with long golden plumose hairs (Fig. 31).

Material examined. Holotype. ♂, China, Yunnan, Xishuangbanna, NWNR: Anma Xinzai (100°39'E, 22°12'N), 13.VI.2013, coll. Pia Oremek. Paratypes. China, Yunnan, Xishuangbanna, NWNR: Mandian (100°40'E, 22°07'N), 1♀, 746 m, 8.VII.2008, coll. A. Weigel; Manfei (100°40'E, 22°08'N), 1♀, 26.VII.2013, coll. Pia Oremek; Naban (100°40'E, 22°09'N), 2♀, 709 m, 26.IV.2009, coll. Lingzeng Meng.

Distribution. China (Yunnan).

Etymology. The type location Yunnan is used to name the species.

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