

# A new species and a newly recorded species in the genus *Macroglossum* Scopoli (Lepidoptera: Sphingidae) from China

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**Abstract:** A new species of the hawkmoth genus *Macroglossum* Scopoli, *Macroglossum chui* Pan & Han sp. nov., is described from Hainan and Guangxi, and the species *Macroglossum clemensi* Cadiou, 1998 is firstly recorded in China. Diagnoses for the species are provided and illustrations of external features and genitalia are presented.

**Key words:** Macroglossinae; taxonomy; distribution

中国长喙天蛾属一新种及一新纪录种记述（鳞翅目：天蛾科）

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**摘要:** 记述产自海南、广西的长喙天蛾属 *Macroglossum* Scopoli, 1777 1 新种：朱氏长喙天蛾 *Macroglossum chui* Pan & Han sp. nov., 以及 1 中国新纪录种：斜带长喙天蛾 *Macroglossum clemensi* Cadiou, 1998, 提供了种的鉴别特征、成虫和外生殖器图。

**关键词:** 长喙天蛾亚科；分类；分布

## Introduction

*Macroglossum*, the type genus of the subfamily Macroglossinae, was originally established by Scopoli (1777) on the basis of *Sphinx stellatarum* Linnaeus, 1758. In Latin, “macro” means “big, huge”, and “glossum” means “tongue”, therefore this name refers to the long proboscis. It is also called “hummingbird hawkmoth” as it resembles the hummingbird that takes nectar with its long proboscis while hovering in front of flowers (Kendrick 2010). These moths may be diurnal, crepuscular or nocturnal.

Holloway (1987) summarized the following features of the genus *Macroglossum*: the antennae are often club-shaped, tapering into a short hook; the abdomen often has lateral and subventral yellow or white patches, terminating in a fan of scales, often with further scale tufts laterally; the forewings are narrow, grey to dark grey or black, with transverse, often sinuous fasciae; the hindwings are usually blackish with a broad yellow or orange medial to subbasal band; the male genitalia are typically macroglossine, bearing the “bird-beak” structure: with

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the uncus slightly curved, forming a tiny hook at tip, and the blunt gnathos; the aedeagus vesica has two large, often rod-like cornuti, and there are no friction scales on the exterior of the valve.

*Macroglossum* is a large genus in the tribe Macroglossini, and contains 97 species (Kitching 2017; Kitching *et al.* 2009). This genus is extremely diverse in the Indo-Australian tropics, but very few species are distributed in America and Africa. These species were described by more than 20 authors. Among them, Boisduval (1832, 1833, 1875) described 10 species from Asia and Europe, and Butler (1875a, b, 1878, 1882) named nine species from Asia and Europe. Rothschild & Jordan (1903, 1912, 1915, 1916) established 25 species from Asia, Europe, Australia and Africa. The most recent additions were made by Lachlan & Kitching (2001), Cadiou & Schnitzler (2001), Eitschberger (2003, 2004, 2005), Schnitzler & Speidel (2004), Haxaire & Melichar (2013), Krutov (2016), and Melichar *et al.* (2016) who erected a total of 13 species. Most of these species are involved in some noted worldwide or regional research, such as Seitz (1928–1929) recorded 64 species in the world, Kitching & Cadiou (2000) listed 84 species worldwide, Moulds (1985) recorded 13 species from Australia, Holloway (1987) recorded 18 species from Borneo, and Pittaway & Kitching (2017) illustrated 28 species and subspecies from the Eastern Palaearctic area. Eitschberger (2006a, b, 2009, 2011a, b) studied the *faro-passalus* complex, the *nigellum-semifasciata* complex, the *limata*-species complex, the *gyrans*-species complex and the *sitiene*-species complex. However, Yen *et al.* (2003) stated that there are few characters that can be used to recognize monophyletic species groups, and that relationships within this genus remain very poorly understood.

Comparatively less progress has been made on *Macroglossum* in China. Chu & Wang (1980) described 2 new species, but both were synonymized by Inoue (1990) and Kitching & Cadiou (2000). Chu & Wang (1997) illustrated 13 species and subspecies of this genus from China. Kendrick (2010) recorded 18 species from Hong Kong. Yen *et al.* (2003) recorded 18 species from Taiwan, including a new subspecies of *M. unguis*.

Through reexamination of specimens of *Macroglossum* in IZCAS and comparison with many other specimens from different sources, a new species was discovered. In this study, we describe a new species from Hainan and Guangxi, China, and redescribe a new record from Yunnan, China.

## Material and Methods

Specimens used in this study are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS). Genitalia were prepared following the standard procedure published by Robinson (1976). Terminology for the genitalia is based on Kitching & Cadiou (2000). Photographs of the moths were taken with digital cameras. Composite images were generated using Auto-Montage software version 5.03.0061 (Synoptics Lts). The plates were compiled using Adobe Photoshop software.

## Taxonomy

### *Macroglossum* Scopoli, 1777

*Macroglossum* Scopoli, 1777: 414. Type species: *Sphinx stellatarum* Linnaeus, 1758: 493, by monotypy. (Europe)

*Psithyros* Hübner, 1819: 132. Type species: *Sphinx stellatarum* Linnaeus, 1758: 493, by subsequent designation by Rothschild & Jordan, 1903, *Novitates Zoologicae*, 9(supplement): 432. (Europe)

*Bombylia* Hübner, 1822: 10–13. Type species: *Sphinx stellatarum* Linnaeus, 1758: 493, by subsequent designation by Rothschild & Jordan, 1903, *Novitates Zoologicae*, 9(supplement): 616. (Europe)

*Macroglossa* Boisduval, 1833, *Nouvelles Annales du Muséum Histoire Naturelle*, 2(2): 226. Type species: *Macroglossa milvus* Boisduval, 1833, *ibidem*, 2(2): 226, by subsequent designation by Fletcher & Nye, 1982, *Generic Names of Moths of the World* 4: 95. (Mauritius: Reunion Island)

*Rhamphoschisma* Wallengren, 1858, *Öfversigt Kongliga Vetenskaps-Akademiens Förhandlingar Stockholm*, 15: 139. Type species: *Rhamphoschisma fasciatum* Wallengren, 1858, *ibidem*, 15: 139, by original designation. (South Africa: Caffraria)

*Rhopalopsyche* Butler, 1875b: 239. Type species: *Macroglossa nycteris* Kollar, 1844, *Kaschmir und das Reich der Siek*, 4: 458, pl. 19, fig. 5, by original designation. (India: Uttar Pradesh, Mussooree)

Distribution. Most species of the genus are distributed in India-Australia tropics, and a few species in Africa, Europe and America.

Biological note. Holloway (1987) stated that the larvae of *Macroglossum* usually have a dorsolateral band, sometimes oblique bars laterally on the abdomen, but never ocellar markings; the pupa has a keeled tongue case. Chu & Wang (1997) illustrated the larvae of *M. stellatarum*, *M. saga* Butler, 1878, *M. bombylans* Boisduval, 1875 and the pupa of *M. corythus luteata* Butler, 1875; Host-plants are mainly from the family Rubiaceae, Lardizabalaceae, Papilionaceae, Labiatae and Crassulaceae. Leong *et al.* (2009) described the larva, pupa, and adult of *M. sitiene* Walker, 1856.

#### 1. *Macroglossum chui* Pan & Han sp. nov. (Figs. 1–4, 9–11)

Description. Upperside. Head, thorax, and abdomen greyish green; Antennae filiform, brown, 11–12 mm in length, apically hooked. Eyes brown. Frons, gena and labial palpus greyish green; a dark line present from the middle of labial palpus to frons and thorax. Labial palpus protruding. Proboscis brown. Abdomen with broad lateral orange yellow patches on sternites 1–3. Anal tuft brown. Forewing. Forewing length: male 21–22 mm, female 22–23 mm. Ground colour brown. Basal and antemedial lines invisible. Submedial band black, not reaching costa, inner edge curved towards wing base, outer edge almost straight. Medial band uniformly pale brown, narrow in male and wide in female. Postmedial line double, faint, dark brown, with the inner line narrow and the outer one darker; protruding between veins  $M_1$  and  $M_3$  and near hind margin, reaching submarginal line, appearing as a fascia in the holotype. Submarginal line brown, moderately curved at middle. Terminal area brown, with a rectangular dark brown patch between veins  $R_5$  and  $M_1$ , and a small triangular patch between veins  $R_4$  and  $R_5$ . Hindwing. Large basal part orange-yellow, a black patch present at wing base, with outer margin concave. Terminal band black, inner margin a little bit curved near anal angle.

Underside. Head and thorax off-white. Abdomen with sternites 1–5 off-white at middle, gradually smaller posteriorly; small white lateral patches present on each segment. Anal tuft

brown. Ground colour of both wings brown, base yellow, large area from base to submarginal line diffused with reddish brown. Forewing with dark brown medial, postmedial, submarginal and terminal lines slightly curved, bent outwards near hind margin. Hindwing with dark brown medial, postmedial and submarginal lines terminate at yellow anal patch, which is fan-shaped; terminal band narrow, dark brown, much darker on anal angle.



Figures 1–8. Adults of *Macroglossum*. 1–4. *Macroglossum chui* sp. nov. 1, 2. Male, holotype; 3, 4. Female, paratype; 5, 6. *M. sitiene*, male; 7, 8. *M. clemensi*, male. 1, 3, 5, 7. Upperside; 2, 4, 6, 8. Underside. Scale bar = 10 mm.

Male genitalia (Figs. 9, 10). Uncus and gnathos forming typical macroglossine “bird-beak” structure. Uncus slightly curved, forming a tiny hook at tip, densely hairy dorsally. Gnathos blunt, tip spinulose ventrally. Tegumen broad. Juxta indistinctly shaped. Transtilla

present. Valva with terminal half slightly tapering, ventral margin convex at middle and almost straight at both sides; sacculus about half length of valva, a setal patch present at base; harpe tapering and pointed. Saccus with a rounded apex, with posterior margin broadly V-shaped. Aedeagus stout, distal end with a short, broad, and hooked process, bearing 4–5 smaller spines at inner side; a long and slender process diverging from the base of the hook, recurved circling aedeagus, tip pointed. Two cornuti present on the vesica, the anterior one is short, slightly curved and pointed; the posterior one is long, broad, straight and sharply pointed.

Female genitalia (Fig. 11). Apophyses anteriores shorter than apophyses posteriores. Lamella postvaginalis narrow band-like, curved, slightly concave at middle. Antrum strongly sclerotized, cylindrical. Ductus bursae very short. Corpus bursae with posterior half narrow, anterior half broad; signum nearly a shuttle-like sclerite, with posterior end sharply pointed.

Diagnosis. On the wing pattern, *M. chui* is very similar with *M. sitiene* (Figs. 5, 6, 12, 13). However, they can be distinguished by the following characters: *M. chui* is a little bit larger in body size; the submedial band is not reaching the costa in *M. chui*, and the inner edge of the submedial band is curved rather than straight as in *M. sitiene*; the yellow band on the hindwing is less extended near anal angle. These two species can be well differentiated by the aedeagus: the distal end of *M. chui* is hook-like and with 4–5 small spines on inner side, whereas it is finger-like and with small spines on outer side in *M. sitiene*; in *M. chui* the curved and slender process at the distal end of aedeagus is much longer than in *M. sitiene*.

**Holotype.** ♂, **China**, Hainan (IZCAS), Yinggen, 200 m, 09-VII-1960, slide no. Sphi-0358, coll. Xuezhong ZHANG. **Paratypes.** 1♀, **China**, Hainan (IZCAS), Tongshi, 340 m, 25-VI-1960, coll. Changqing LI; 1♀, same locality, 04-VIII-1960, slide no. Sphi-0395, coll. Suofu LI; Guangxi (IZCAS), 1♂, Baisha, Yangshuo, 150 m, 18-VII-1963, slide no. Sphi-0394, coll. Chunguang WANG.

Distribution. China (Hainan, Guangxi).

Etymology. The specific name is dedicated to Professor Hongfu CHU, a famous Chinese entomologist who did remarkable work on Lepidoptera taxonomy, including SpHINGIDAE.

## 2. *Macroglossum clemensi* Cadiou, 1998 (Figs. 7, 8, 14), new record to China

*Macroglossum clemensi* Cadiou, 1998, *Lambillionea*, 98(1): 2, fig. d. (Indonesia)

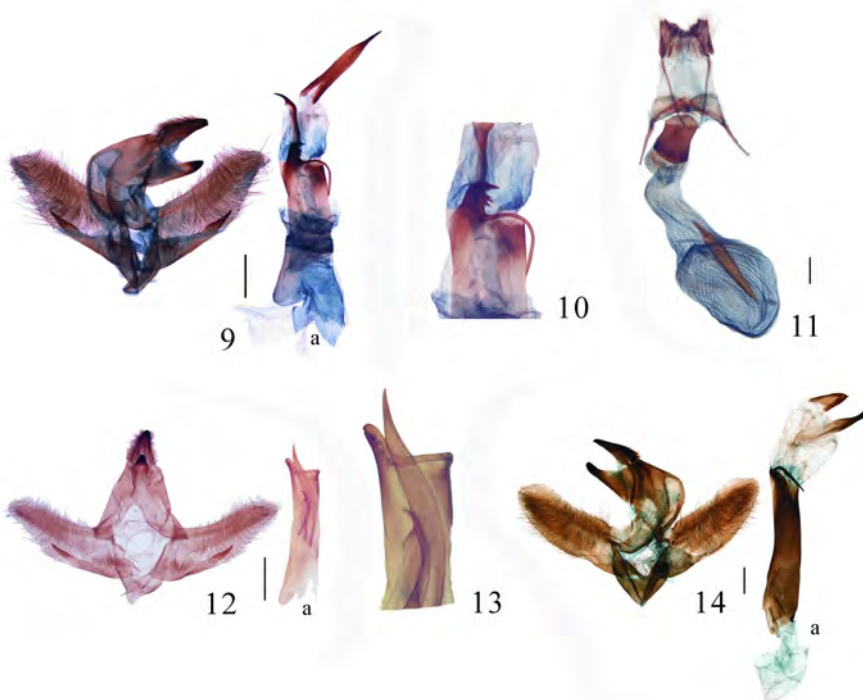
Redescription. Upperside. Head, thorax, and abdomen greyish green. Antennae filiform, brown, 12–13 mm in length, apically hooked. Dark line present at the middle of head, thorax and labial palpus. Labial palpus protruding, almost triangular. Eyes brown. Tegula with posterior edge white. Orange yellow lateral patches present on sternites 2–3. Anal tuft dark brown. Forewing length, male 28 mm. Base darker. An oblique line from middle of costa to about three-fourths of forewing hind margin, dividing forewing into two parts: the basal part greyish green, and the marginal part much darker. Postmedial line faint. Submarginal line dark brown above vein  $M_3$ , indistinct from  $M_3$  to anal angle. Hindwing. Large basal part yellow; a black patch present at wing base. Black terminal band broad, inner margin convex at middle, strongly concave at anal angle and only a narrow line retained.

Underside. Head off-white, thorax is darker than head. Proboscis brown. Abdomen and anal tuft brown. Ground color of both wings brown, base pale yellow. Forewing with indistinct submarginal and marginal lines. Marginal area darker. Hindwing with costa dark brown, medial, postmedial and submarginal lines dark brown, terminating at yellow anal patch, which

is fan-shaped; terminal band narrow, dark brown, much darker on anal angle.

Male genitalia (Fig. 14). Uncus and gnathos forming typical macroglossine “bird-beak” structure. Uncus slightly curved, forming a tiny hook at tip, densely hairy dorsally. Gnathos slightly curved inside, tip spinulose ventrally. Tegumen broad. Juxta undeveloped. Transtilla present. Valva with basal and terminal parts almost in same width, tip blunt. Saccus short, almost one-fourth of valva, a setal patch present at base, harpe tiny, pointed at tip. Saccus broadly V-shaped with a rounded apex. Aedeagus long and slender, distal end with two pointed processes, one very short and erect; the other longer than the width of aedeagus and bent downwards. Two cornuti present on the vesica, one broader, shorter and tapering, pin-pointed at end; the other longer and stick-like, tip rounded, subapically narrow.

Diagnosis. On the wing pattern, *M. clemensi* can be differentiated from *M. chui* and *M. sitiene* by the distinctive oblique line on the forewing, the larger body size, and the hindwing yellow band being more extended at anal angle. In the male genitalia, *M. clemensi* is characterized by the tiny harpe, and the aedeagus which is different from the previous two species in the distal processes and cornuti.



Figures 9–14. Genitalia of *Macroglossum*. 9–11. *M. chui* sp. nov. 9, 10. Male, holotype; 10. Magnification of aedeagus; 11. Female, paratype; 12, 13. *M. sitiene*; 13. Magnification of aedeagus; 14. *M. clemensi*. a–aedeagus. Scale bars=1 mm.

**Specimen examined.** 1♂, **China**, Yunnan (IZCAS), VII–VIII-2013, slide no. Sphi-0362, light trap, coll. Shuxian LIU & Xinxin LI.

Distribution. China (Yunnan); Indonesia.

Remarks. This single recognized male specimen of *M. clemensi* was collected from Yunnan in 2013. Unfortunately, the handwriting on the packed bag of this specimen was indiscernible, and the exact locality cannot be traced.

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