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SHORT COMMUNICATION

Description of a large new stonefly species *Claassenia xucheni* sp. nov. from China (Plecoptera: Perlidae)

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Abstract. *Claassenia xucheni* sp. nov., a new species of the perlid genus *Claassenia* Wu, 1934 is described and illustrated based on eight males and two females collected in the Jiuchongshan National Forest Park, Chongqing city, China. The new species is characterized by round patch of sensilla basiconica on tergum 9, triangular median sclerite between hemitergal lobes, scattered sensilla basiconica on hemitergal lobes, complicated sclerotization pattern on male sternum 9, membranous and curved aedeagus, and by slightly posteromedially protruded female subgenital plate. An annotated checklist of Chinese species of *Claassenia* is presented based on data from the literature.

Key words. Plecoptera, Perlidae, *Claassenia*, new species, description, checklist, China

Zoobank: http://zoobank.org/urn:lsid:zoobank.org:pub:9C7CD6A1-79D3-43BD-9BB3-D8533EA090EF

Introduction

Claassenia Wu, 1934 is a perlid genus with 12 species known from the Nearctic and east Palaearctic areas (Stark & Sivec 2010, Dewalt et al. 2019). This genus is a unique member of the subfamily Perlinae Latreille, 1802, exhibiting male hammers that otherwise occur only in the other subfamily, Acroneuriinae Klapálek, 1914 (Sivec et al. 1988). Revisionary works concerning *Claassenia* have been provided by Stark & Gaufin (1976), Sivec et al. (1988) and Stark & Sivec (2010). However, most species of this genus are still poorly known, lacking modern redescriptions and illustrations. To date, nine valid species of *Claassenia* are known from China, including *C. bischoffi* (Wu, 1935), *C. caudata* (Klapálek, 1916), *C. fulva* Wu, 1973, *C. gigas* (Klapálek, 1916), *C. longistyla* Wu, 1973, *C. magna* Wu, 1948, *C. radiata* (Klapálek, 1916), *C. semibrachyptera* Wu & Claassen, 1934, and *C. tincta* (Navás, 1923). Another three described but uncertain species from China, *C.* ChA, *C.* ChB, and *C.* ChB, were also reported by Stark & Sivec (2010).

In this study, a new species of *Claassenia* is identified and described based on material from Chongqing city in China. The male and female of the new species are described and compared with all congeners. An annotated checklist of Chinese species of *Claassenia* is provided based on data from the literature (Table 1). The distribution of these *Claassenia* species in China is explored by mapping their type localities.

Materials and methods

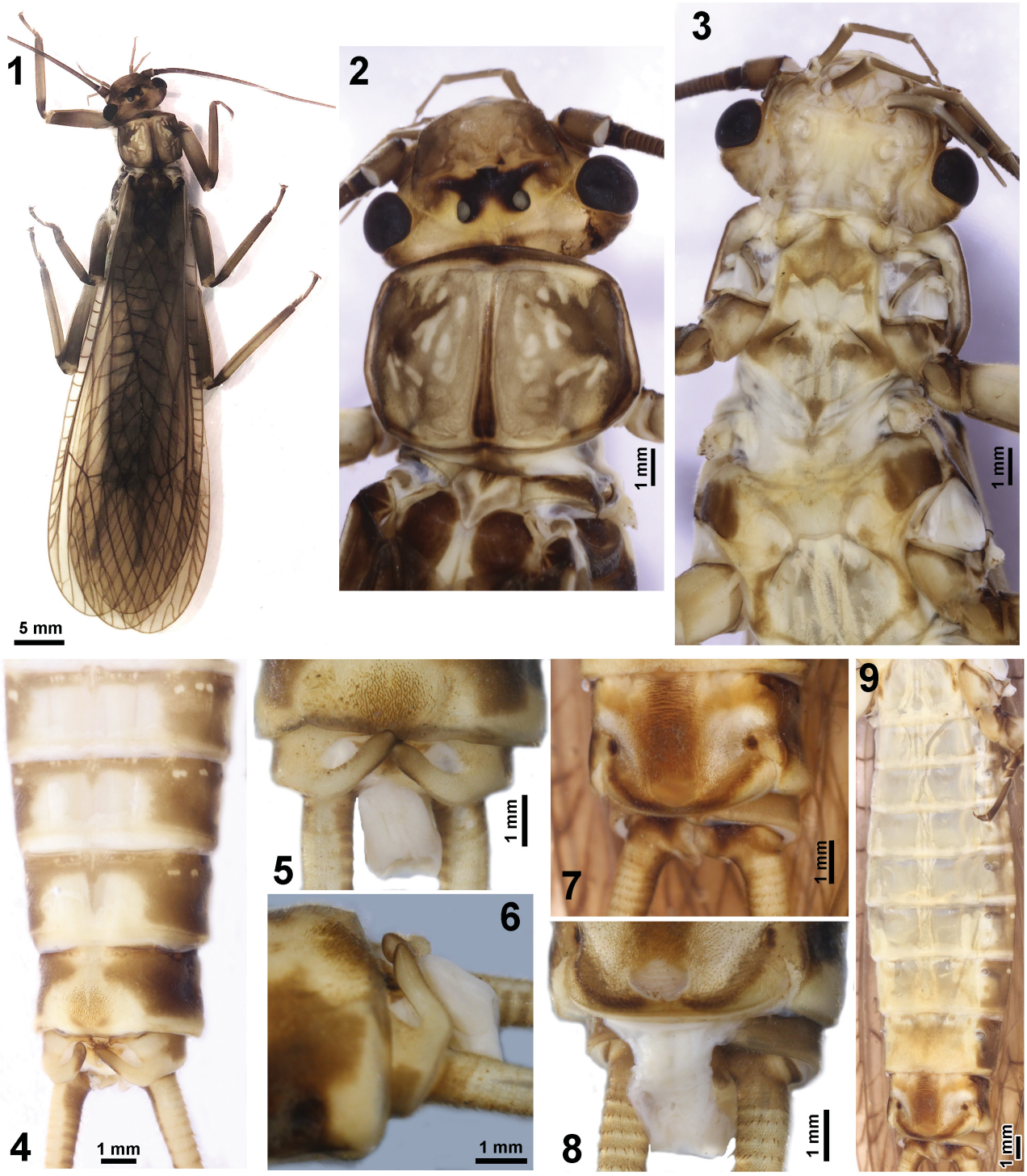
The specimens used in this study were collected by light trap (a high-pressure mercury lamp with three assembled pieces of cloths), preserved in 75% ethanol, and donated by Mr. Chen Xu. Immature eggs were taken from female abdomen. Details of the morphology were studied with a XTL-206A stereo microscope. Photos were taken with a MC2000 digital camera and optimized with Adobe Photoshop CS6. Generic assignment of the new species follows Chen & Du (2018).

The specimens are deposited in the Insect Collection of Jiangsu University of Science and Technology, Jiangsu Province, China (ICJUST).

Taxonomy

Claassenia xucheni sp. nov.

Type material. Holotype: ♂ (ICJUST): **China: Chongqing City:** Jiuchongshan National Forest Park, 31.89 N, 108.52 E, H: 1760 m, 18.vi.2019, light trap, Chen Xu leg. Paratypes: 7 ♂♂ 2 ♀♀ (ICJUST), same locality and data as holotype.



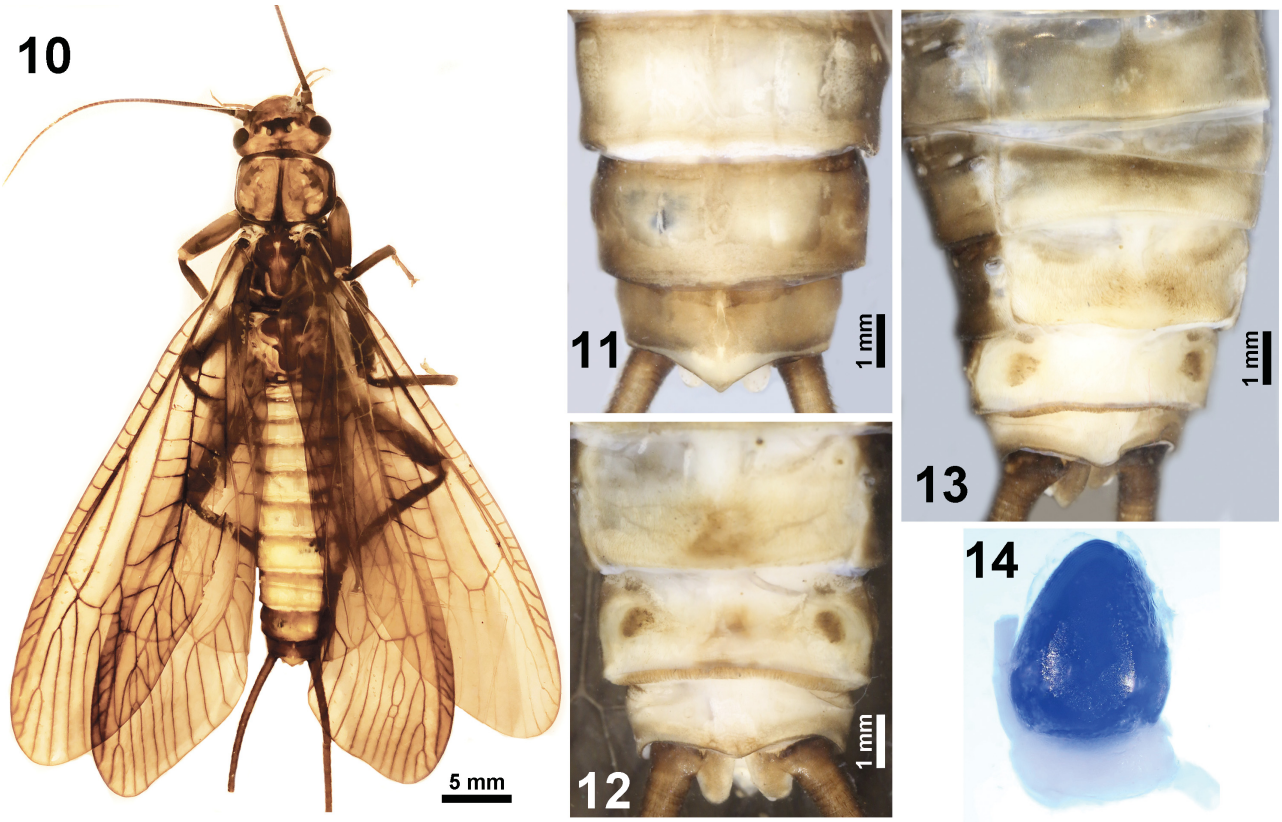
Figs 1–9. *Claassenia xucheni* sp. nov., adult male. 1 – habitus, dorsal view; 2 – head and pronotum, dorsal view; 3 – head and thorax, ventral view; 4 – abdomen, dorsal view; 5 – terminalia and aedeagus, dorsal view; 6 – terminalia and aedeagus, lateral view; 7 – terminalia, ventral view; 8 – terminalia and aedeagus, ventral view; 9 – abdomen, ventral view.

Description. ***Male*** (Figs 1–9). Body length (excluding antennae and cerci) 30.0–38.0 mm (n = 8), generally brown, with dark brown patterns.

Head (Figs 1–3) wider than long, generally pale brown. Triocellate, each ocellus with dark inner margin; ocellar area with dark trapezoidal stigma. Compound eyes dark and round. Antenna dark brown and slender, slightly longer than abdomen. Maxillary and labial palps with apical segments shortest.

Pronotum (Figs 1–3) nearly as wide as head, sub-rectangular with obtuse corners. Pronotal disc mostly pale brown, margins dark, median suture dark but interrupted anteriorly; surface of pronotum scattered with irregular brown patterns. Meso- and metanota as wide as pronotum, mostly dark brown. Macropterous, wings pale brown, veins brown. Legs generally pale brown; apex of femur, base of tibia and tarsal segments dark.

Abdomen (Figs 4–9) mostly pale; terga 2–8 with brown



Figs 10–14. *Claassenia xucheni* sp. nov., adult female. 10 – habitus, dorsal view; 11 – terminalia dorsal view; 12 – terminalia of one female paratype with median sclerites on sterna 8–9, ventral view; 13 – terminalia of the other female paratype without median sclerites on sterna 8–9, ventral view; 14 – egg taken from the female abdomen, lateral view.

anterior margin and lateral surfaces. Tergum 9 laterally dark brown, each side with dark spot; median area of tergum 9 membranous with round patch of sensilla basiconica; spinal patch posterolaterally with two elliptical brown spots. Tergum 10 cleft into two parts, anterior margin of each part dark, sclerotized and apically touching triangular median sclerite; hemitergal lobes thick and finger-shaped, curved basally and sclerotized apically; posterior surface of hemitergal lobes with scattered, tiny sensilla basiconica; from lateral view, hemitergal lobes strongly upcurved, with uniform width except for tapered apices, ventroapical margins weakly sclerotized. Sterna 1–8 unmodified; sternum 9 with elliptical, rugose, hairy median sclerite, the sclerite with two anterior arms reaching lateral parts of tergum 9; posterior of hair patch with pale, elliptical hammer; posterior half of sternum 9 transformed into broad subgenital plate with C-shaped sclerite along caudal edge which medially touches hammer. Each end of C-shaped sclerite with small dark spot. Paraprocts long triangular and mostly brown, slightly upcurved but invisible from dorsal view. Everted aedeagus strongly curved forwards, completely membranous, without any conspicuous lobes or spines; apical half of aedeagus tongue-shaped, dorsally with several grooves. Cerci brown, very thick, subequal in length to abdomen.

Female (Figs 10–14). Body length (excluding antennae and cerci) 40.0–41.0 mm (n = 2), general body color and pattern similar to males. Terga 9–10 brown, tergum 10 with triangular posterior projection. Sterna 2–5 each with pair of pale median spots. Posteromedial area of sternum 8 slightly sclerotized in one female paratype but unsclerotized in the other paratype; subgenital plate broad and slightly protruded posteromedially. Sternum 9 humped medially, with two brown lateral spots; median area of sternum 9 slightly sclerotized in one female paratype but unsclerotized in the other paratype; posterior margin of sternum 9 folded into two layers, posterior layer sclerotized and rugose. Sternum 10 mostly pale, posterolateral margins brown. Paraprocts long, triangular and mostly brown, slightly upcurved.

Extracted egg (Fig. 14) acorn-shaped; chorion surface smooth and darkly sclerotized, without visible micropyles; collar and anchor degraded.

Etymology. The species is named after Mr. Chen Xu who collected and generously provided the specimens for study.

Biology. The holotype was caught by a light trap (Figs 15–17), showing a positive phototaxis. The light trap was set near the unnamed river in the Jiuchongshan National Forest Park. The river was slow-flowing and green, and its substrate was limestone. Perennial plants constituted the dense forest on the mountains near the river, which provided perfect habitat for the emerged adults (Fig. 15).

Distribution. China: Chongqing city (Fig. 18).

Discussion

The new species exhibits diagnostic morphological characters when compared with its congeners. *Claassenia xucheni* differs from *C. bischoffi* in triangular

Figs 15–17. *Claassenia xucheni* sp. nov. 15 – the type locality in the Jiuchongshan National Forest Park, China; 16 – light trap near the type locality; 17 – adult habitus on the light trap.

median sclerite on male tergum 10, and complicated sclerotization pattern on male sternum 9 (see Wu 1938: figs 163–164). Genital structures of both male and female of *C. caudata* were not described. However, the pronotum of *C. caudata* is entirely dark, and the subcostal veins of forewings are consistently connected with the radial cross veins (Klapálek 1916); in *C. xucheni*, the pronotum is mostly pale brown and the subcostal veins of forewings are distant from radial cross veins; the body length of *C. caudata* is also apparently shorter than that of *C. xucheni*. *Claassenia xucheni* differs from *C. fulva* in having triangular median sclerite on male tergum 10 and complicated sclerotization pattern on male sternum 9 (Wu 1973: figs 94–95). *Claassenia gigas* only has descriptions of body length and color pattern for the female holotype; the originally described 'entirely dark brown' color of head, pronotum and entire body is obviously different from *C. xucheni* (Klapálek 1916). In *C. longistyla*, the hemitergal lobes are distinctly elongated and recurved over posterior half of tergum 9, while the hemitergal lobes of *C. xucheni* are not elongated, barely touching the posterior margin of tergum 9 (Wu 1973: fig. 96). When compared with *C. magna*, *C. xucheni* has no papilla patch on tergum 8; the sclerotization pattern on sternum 9 is completely different from *C. magna* (Wu 1948: figs 4–5). When compared with *C. radiata*, *C. xucheni* has no papilla patch on tergum 8; the aedeagus of *C. xucheni* is strongly curved, not cylinder-shaped as in *C. radiata* (Klapálek 1916, Stark & Sivec 2010). In *C. semibrachyptera*, the hemiterga have no conspicuous sensilla basiconica, which are present in *C. xucheni*; the papilla patch on tergum 9 is wide in *C. semibrachyptera*, but is round in *C. xucheni*; female subgenital plate of *C. semibrachyptera* is slightly notched posteromedially, but slightly protruding posteromedially in *C. xucheni* (Wu 1938: figs 168–170, Stark & Sivec 2010: fig. 20). In *C. tincta*, the male has no papilla patch on tergum 9, no lateral spots, and has C-shaped posterior sclerite on sternum 9 as in *C. xucheni* (Wu 1938: figs 171–173). In *C.* ChA, apices of the hemitergal lobes are swollen and each with a sensilla basiconica patch, ventroapically membranous, while in *C. xucheni*, apices of the hemitergal lobes are tapered with scattered sensilla basiconica and ventroapically sclerotized (Stark & Sivec 2010: figs 26–27). In *C.* ChB, the only known egg is apically truncate and surrounded with conspicuous micropyles, but the egg of *C. xucheni* has a sharp apex and no visible micropyles (Stark & Sivec 2010: figs 28–31). In *C.* ChC, the hemitergal lobes are swollen medially and the subgenital plate of female is bilobed, while in *C. xucheni*, the hemitergal lobes are not swollen and the subgenital plate of female is complete (Stark & Sivec 2010: figs 32–34). In addition, *C. xucheni* can also be easily distinguished from the Russian species *C. brachyptera* Brinck, 1954 and the Bhutanese species *C. drukpa* Stark & Sivec, 2010 by genitalic characters of males and females, including

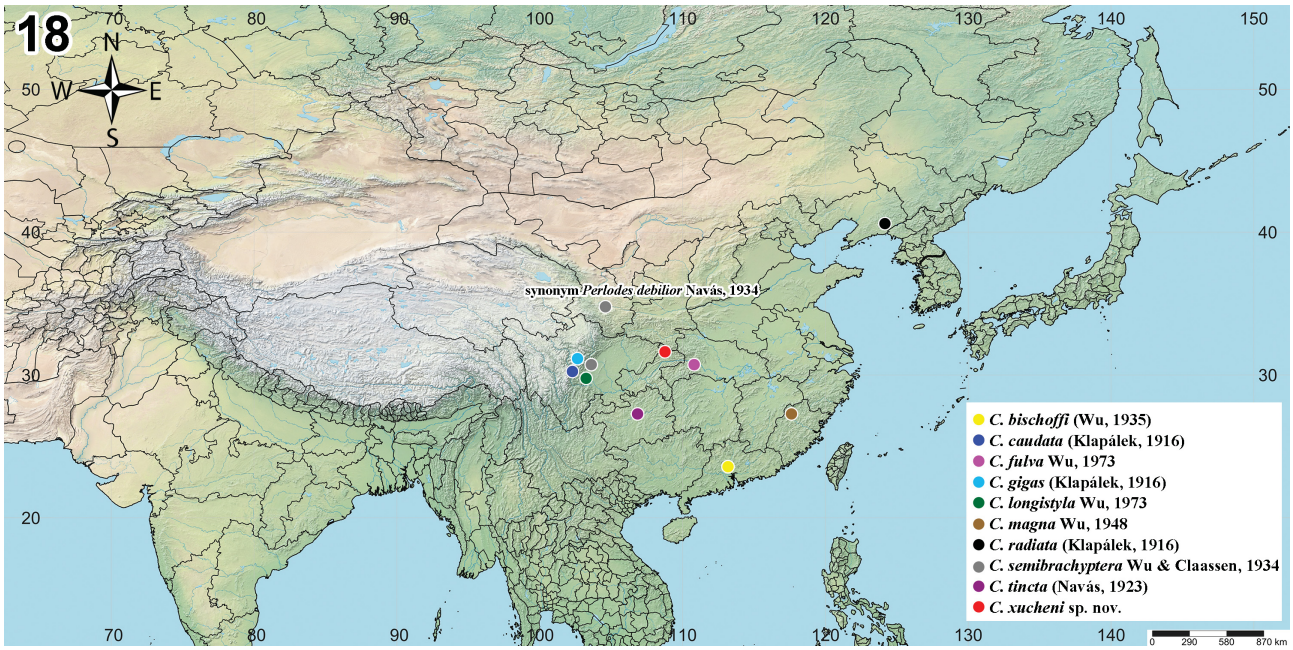


Fig. 18. Distribution of *Claassenia* species in China. *Perlodes debilior* Navás, 1934, a junior synonym of *C. semibrachyptera* described from the south part of Gansu Province is also indicated with a grey spot; another two synonyms, *Perlodes brevipennis* Navás, 1934 and *Perlodes simplicior* Navás, 1934, were described from the same locality as the types of *C. semibrachyptera*.

Table 1. Annotated checklist of *Claassenia* species in China. Species without described of genitalia are marked with asterisk (*).

Species	Available description	Type locality
C. bischoffi (Wu, 1935)	♂	China: Guangdong: Guangzhou City
**C. caudata* (Klapálek, 1916)	♂♀	China: Sichuan: Tun River, Luding Bridge
C. fulva Wu, 1973	♂	China: Hubei: Yichang City, Changyang County, Duzhenwan
**C. gigas* (Klapálek, 1916)	♀	China: Sichuan: Baoxing County
C. longistyla Wu, 1973	♂	China: Sichuan: Emeishan, Baoguosi
C. magna Wu, 1948	♂	China: Fujian: Shaowu City, Dazhulan
C. radiata (Klapálek, 1916) = *Acroneuria manchuriana* Banks, 1920	♂♀	China: Liaoning: Dandong City, Yalu River
C. semibrachyptera Wu & Claassen, 1934 = *Perlodes brevipennis* Navás, 1934 = *Perlodes debilior* Navás, 1934 = *Perlodes simplicio*r Navás, 1934	♂♀	China: Sichuan: between Ya'an City and Yibin City
C. tincta (Navás, 1923)	♂	China: Guizhou
C. xucheni sp. nov.	♂♀	China: Chongqing City: Jiuchongshan National Forest Park

round patch of sensilla basiconica on tergum 9, triangular median sclerite between hemitergal lobes, scattered sensilla basiconica on hemitergal lobes, complicated sclerotization pattern on male sternum 9, membranous and curved aedeagus, and slightly posteromedially protruded female subgenital plate (Teslenko & Zhiltzova 2009: figs 282–284; Stark & Sivec 2010: figs 1–7).

Except for *C. radiata* from northeastern China, Chinese species of *Claassenia* are mainly distributed in southern half of China, with a relatively high biodiversity in Sichuan Province (Fig. 18). However, this knowledge is still insufficient; more specimens of *Claassenia* should be collected to verify its distribution in China. Redescriptions and illustrations should also be supplemented for the older known species.

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