

A NEW SPECIES OF THE SPIDER GENUS *CLUBIONA*  
FROM CHINA, WITH DESCRIPTION OF THE MALE OF  
*CLUBIONA QIYUNENSIS* (ARANEAE: CLUBIONIDAE)

PANLONG WU and FENG ZHANG\*

*The Key Laboratory of Invertebrate Systematics and Application  
College of Life Sciences, Hebei University, Baoding, Hebei 071002, P. R. China*

\*Corresponding author. E-mail: dudu06042001@163.com

The present paper reports on two *Clubiona* species from China, *C. calycina* sp. n. and *C. qiyunensis* Xu, Yang et Song, 2003, belonging to the *japonica*-group and the *corticalis*-group, respectively. The male of *C. qiyunensis* is described here for the first time.

Key words: spiders, taxonomy, Clubionidae, *Clubiona*.

## INTRODUCTION

*Clubiona* Latreille, 1804, is the largest genus of the sac spider family Clubionidae *sensu lato* (DANKITTIPAKUL & SINGTRIPOP 2008). The genus consists currently of 465 nominal species distributed worldwide (PLATNICK 2014), and of which at least 98 species have been reported from China (LI & WANG 2014).

There has been some dispute for a long time about the limits of groups and internal structure in this genus (DEELEMEN-REINHOLD 2001) which has been revised both regionally and on a worldwide scale (DONDALE & REDNER 1976, MIKHAILOV 1990, 1991, 1995, 2002, 2012, DEELEMEN-REINHOLD 2001, WUNDERLICH 2011). LOHMANDER (1944) established the genus *Paraclubiona* (corresponding to the present subgenus *Atalia* Thorell, 1887) for *C. corticalis* (Walckenaer, 1802), however, MIKHAILOV (1990) suppressed the genus status of *Paraclubiona* to a subgenus, and defined the *corticalis*-group and *japonica*-group, and he also (1995, 2012) divided Holarctic *Clubiona* species into four subgenera (*Atalia* Thorell, 1887, *Tolophus* Thorell, 1891, *Bucliona* Benoit, 1977 and *Clubiona* s. str. Latreille, 1804) and 14 species groups.

DEELEMEN-REINHOLD (2001) suppressed the subgenera statuses among *Clubiona* and divided the Southeast Asian *Clubiona* species into six groups; the subgenera *Japoniona* and *Paraclubiona* were reverted to form the *japonica*-group and *corticalis*-group, respectively. The *japonica*-group species can be recognized by the following characteristics; filiform embolus, large and sclerotized conductor of various shapes, and the anterior position of the furrow or window in the epigyne. While the *corticalis*-group species can be recognized by the small copulatory openings, enlarged bursae, and the more or less expanded tegulum filled with meandering ducts (the contours of ducts not clear through chitinized tegulum).

In China, there are at least 7 species which can be identified to the *japonica*-group based on the above group characters: *C. drassodes* O. P.-Cambridge, 1874, *C. vigil* Karsch, 1879, *C. japonica* L. Koch, 1878, *C. melanothele* Thorell, 1895, *C. coreana* Paik, 1990, *C. circulata* Zhang et Yin, 1998 and *C. calycina* sp. n.

Also, in China, there are at least 15 species which can be identified to the *corticalis*-group based on the above group characters: *C. qiyunensis* Xu, Yang et Song, 2003, *C. pyrifer*a Schenkel, 1936, *C. kurosawai* Ono, 1986, *C. parallela* Hu et Li, 1987, *C. yaginumai* Hayashi, 1989, *C. lyriformis* Song et Zhu, 1991, *C. moralis* Song et Zhu, 1991, *C. taiwanica* Ono, 1994, *C. didentata* Zhang et Yin, 1998, *C. altissimoides* Liu, Yang, Griswold et Ubick, 2007, *C. cylindrata* Liu, Yang, Griswold et Ubick, 2007, *C. lamina* Zhang, Zhu et Song, 2007, *C. tengchong* Zhang, Zhu et Song, 2007, *C. cordata* Zhang et Zhu, 2009 and *C. brachyptera* Zhu et Chen, 2012.

While examining the spider specimens collected from Tianchi Mountain and Baiyun Mountain, Henan Province, we found pairs of *japonica*-group specimens in the same location, which are with similar habitus, markings, leg spination and other characters (Figs 1–2) and are differed from other *japonica*-group species. Therefore it is very likely they are the opposite sexes of the same species, and here we describe it under the name of *C. calycina* sp. n.

In the same way, we found 10 male and 19 female *corticalis*-group specimens collected from Wuyi Mountain, Fujian Province of China. Based on the epigynal morphology, we identified the female as *C. qiyunensis* Xu, Yang et Song, 2003. The habitus, markings and leg spination of the male specimens are similar to female *C. qiyunensis* (Figs 13–14), and palpal structures are conform to *corticalis*-group. As a result, we describe the male as a match to the female of *C. qiyunensis*.

## MATERIAL AND METHODS

All specimens studied are kept in 75% ethanol and deposited in the Museum of Hebei University (MHBU), Baoding, China. All specimens were examined under a Tech XTL-II stereomicroscope. The photos, drawings, and measurements were finished using a Leica M205A stereomicroscope equipped with a DFC450 CCD camera and a drawing tube. Carapace length was measured from the anterior margin to the posterior margin of the carapace medially. The measurements of eyes were measured as the maximum diameter of the lens in dorsal or frontal view. The measurements of legs were shown as total length (femur, patella, tibia, metatarsus, tarsus). The epigyne was cleared in a solution of potassium hydroxide (KOH) and transferred to 75% ethanol for taking photos, drawing, and measuring. All measurements are in millimeters.

The following abbreviations are used: ALE = anterior lateral eyes; AME = anterior median eyes; C = conductor; CO = copulatory openings; E = embolus; FD = fertilization ducts; MOA = median ocular area; PLE = posterior lateral eyes; PME = posterior median eyes; RTA = retrolateral tibial apophysis; S = spermathecae; TA = tegular apophysis.

## TAXONOMY

**Clubiona calycina** sp. n.

(Figs 1–12)

Type material. Holotype male, CHINA: Henan Province, Song County, Tianchi Mountain (34°16.30'N, 111°51.17'E), 12 July 2004, Mingsheng Zhu leg. Paratypes: 1 male and 2 females, same data as holotype; 1 male, Henan Province, Baiyun Mountain (33°40.80'N, 111°50.47'E), South Valley, 20 July 2002, Jinyu Yang leg.

Diagnosis. This species is characterized by the following combination of characters: the embolus filiform and its tip reaching the top of conductor; the median part of conductor expanded distinctly; RTA thumb-shaped; copulatory ducts calyx-shaped in ventral view.

Etymology. The species epithet is derived from the Latin word 'calycinus', and refers to the shape of copulatory ducts in ventral view.

Description – Male. Total length 6.19–6.32; holotype body 6.19 long; cephalothorax 2.98 long, 1.98 wide; abdomen 3.31 long, 1.66 wide. Carapace yellow brown. Head region slightly elevated above thorax, with Y-shaped marking behind posterior eyes. Radial furrow obvious. Median furrow longitudinal. Anterior eye row recurved, posterior eye row almost straight in dorsal view (Fig. 2). Diameters of eyes: AME 0.16, ALE 0.15, PME 0.15, PLE 0.14. Interdistances of eyes: AME–AME 0.09, AME–ALE 0.06, PME–PME 0.27, PME–PLE 0.17. MOA 0.37 long, front 0.39 wide, back 0.52 wide. Chelicerae dark brown, promargin with three teeth, retromargin with two teeth. Endites dark brown, longer than wide. Labium reddish-brown, longer than wide. Sternum 1.45 long, 0.96 wide. Legs yellow. Tibia I with three pairs of ventral spines, tibia II with five ventral spines. Measurements of legs: I 7.88 (2.25, 0.94, 2.20, 1.65, 0.84), II 8.46 (2.46, 1.00, 2.42, 1.69, 0.89), III 6.56 (2.04, 0.77, 1.42, 1.74, 0.59), IV 9.23 (2.67, 0.98, 2.17, 2.72, 0.69). Leg formula: 4213. Abdomen ovoid, brown yellow, with conspicuous anterior tufts of hairs; dorsum with yellow thin hairs; cardiac pattern dark brown; posteriorly with paired brown markings consisting of numerous stripes and spots (Fig. 2); venter brown. Spinnerets brown. RTA simple, small and thumb-shaped (Figs 6, 11); embolus filiform, originating from the middle of the tegulum prolaterally, and its tip reaching top of conductor (Figs 5–6, 10–11); conductor large and sclerotized, cap-shaped from ventral view, with a large membrane in front of it; tegular apophysis triangular in ventral view, situated at the middle of tegulum (Figs 6–7, 11–12).

Female. Total length 8.94–9.03; one specimen measured (from Tianchi Mountain), body 8.94 long; cephalothorax 3.85 long, 2.57 wide; abdomen 5.13 long, 2.78 wide. Diameters of eyes: AME 0.17, ALE 0.17, PME 0.15, PLE 0.17. Interdistances of eyes: AME–AME 0.14, AME–ALE 0.12, PME–PME 0.40, PME–PLE 0.25. MOA 0.43 long, front 0.47 wide, back 0.69 wide. Labium 0.72 long, 0.48 wide. Sternum 1.86 long, 1.16 wide. Metatarsus II with a single ventral spine. Measurements of legs: I lost, II 9.07 (2.48, 1.45, 2.40, 1.67, 1.07), III 7.35 (1.95, 1.14, 1.55, 1.94, 0.77), IV 10.10 (2.47, 1.35, 2.34, 3.02, 0.92). Other characters as in male (Fig. 1). Copulatory openings anteriorly; copulatory ducts obvious and parallel in ventral



**Figs 1–7.** *Clubiona calycina* sp. n.: 1 = female habitus, dorsal view; 2 = male habitus, dorsal view; 3 = epigyne, ventral view; 4 = vulva; 5–7 = left male palp: 5 = prolateral view; 6 = ventral view; 7 = retrolateral view. Scale bars: 1.00 mm (1–2); 0.20 mm (3–4); 0.25mm (5–7).

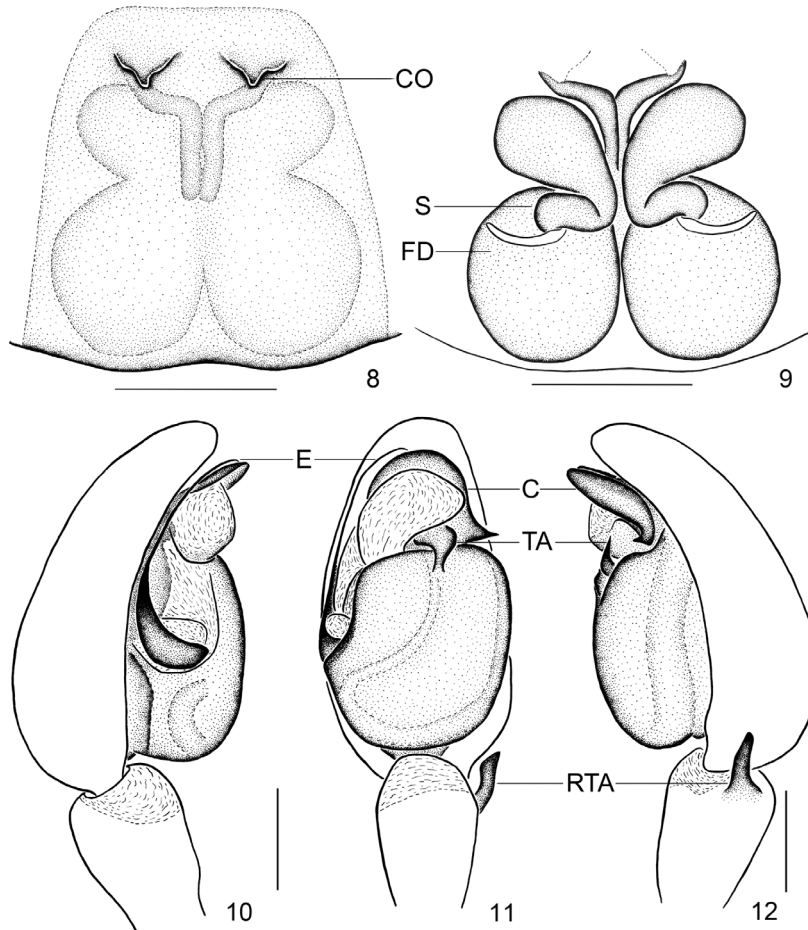
view (Figs 3, 8); spermathecae tubular; fertilization ducts long and lance-shaped; bursae spherical, larger than spermathecae (Figs 4, 9).

Distribution. Only known from the type locality.

*Clubiona qiyunensis* Xu, Yang et Song, 2003  
(Figs 13–23)

*Clubiona qiyunensis* Xu, Yang & Song, 2003: 412, fig. 2A–C.

Diagnosis. This species is characterized by the following combination of characters: the bulb projecting; the embolar base wide; the retrolateral femur



**Figs 8–12.** *Clubiona calycina* sp. n.: 8 = epigyne, ventral view; 9 = vulva; 10–12: left male palp, 10 = prolateral view, 11 = ventral view; 12 = retrolateral view. Scale bars: 0.25 mm (8–12).



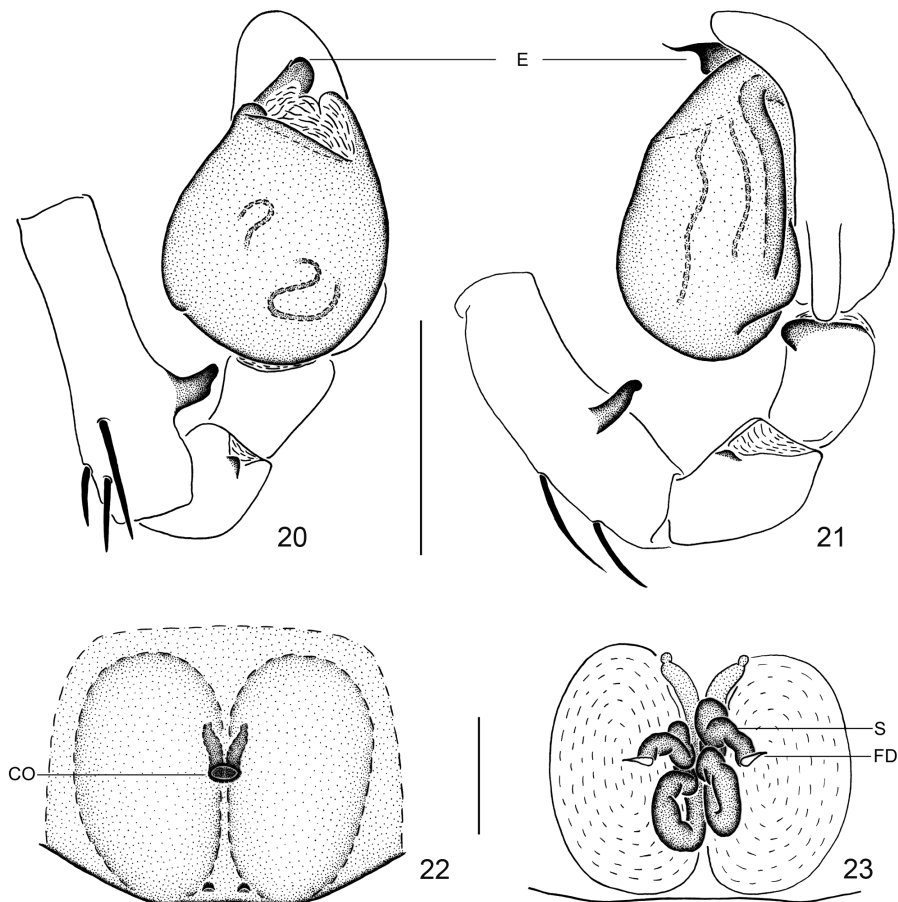
apophysis long and narrow; the copulatory openings small and close to each other; copulatory ducts with two branches, one short and horn-like, the other long and folding back upon itself longitudinally.

Description – Male. Total length 4.14–4.44; one specimen measured, body 4.14 long; cephalothorax 1.78 long, 1.36 wide; abdomen 2.46 long, 1.33 wide. Carapace oval and yellowish. Median furrow longitudinal. In dorsal view, anterior eye row recurved, posterior eye row almost straight (Fig. 14). Diameters of eyes: AME 0.10, ALE 0.13, PME 0.11, PLE 0.11. Interdistances of eyes: AME–AME 0.07, AME–ALE 0.05, PME–PME 0.20, PME–PLE



**Figs 13–19.** *Clubiona qiynensis* Xu, Yang et Song, 2003: 13 = female habitus, dorsal view; 14 = male habitus, dorsal view; 15 = epigyne, ventral view; 16 = vulva; 17–18: left male palp: 17 = prolatateral view; 18 = ventral view; 19 = retrolateral view. Scale bars: 1.00 mm (13–14); 0.20 mm (15–19).

0.13. MOA 0.29 long, front 0.25 wide, back 0.41 wide. Chelicerae dark yellow, promargin with six teeth, retromargin with four teeth. Endites yellow brown, longer than wide. Labium brown, longer than wide, the tip of it with black hairs. Sternum ovoid and yellowish, its surface covered with conspicuous short and thin hairs. Legs yellow brown, both tibia I and II with two pairs of ventral spines. Measurements of legs: I 4.59 (1.26, 0.64, 1.25, 0.92, 0.52), II 5.12 (1.37, 0.70, 1.48, 1.02, 0.55), III 4.29 (1.24, 0.54, 0.97, 1.08, 0.46), IV 5.73 (1.63, 0.65, 1.40, 1.53, 0.52). Leg formula: 4213. Abdomen ovoid, brown yellow, with conspicuous anterior tufts of hairs; dorsum with thin hairs and gray markings (Fig. 14); cardiac pattern yellow brown. The palpal retrolateral femur apophysis spinous, RTA small and blunt; embolus wide and short, originating from tegulum prolaterally, obliquely upward extending, and reaching the edge of the retrolateral cymbium; sperm duct obvious, almost straight in retrolateral view (Figs 17–21).



**Figs 20–23.** *Clubiona qiynensis* Xu, Yang et Song, 2003: 20–21: left male palp: 20 = ventral view; 21 = retrolateral view; 22 = epigyne, ventral view; 23 = vulva. Scale bars: 0.50 mm (20–21); 0.25 mm (22–23).

Female. Total length 5.04–5.38; one specimen measured (from Wuyi Mountain), body 5.38 long; cephalothorax 1.92 long, 1.42 wide; abdomen 3.33 long, 1.87 wide. Diameters of eyes: AME 0.08, ALE 0.13, PME 0.12, PLE 0.10. Interdistances of eyes: AME–AME 0.08, AME–ALE 0.06, PME–PME 0.22, PME–PLE 0.15. MOA 0.29 long, front 0.24 wide, back 0.41 wide. Promargin with six teeth, retromargin with five teeth. Labium 0.31 long, 0.25 wide. Sternum 1.08 long, 0.74 wide. Measurements of legs: I 4.08 (1.18, 0.60, 1.06, 0.78, 0.46), II 4.47 (1.30, 0.63, 1.23, 0.85, 0.46), III 3.95 (1.17, 0.57, 0.80, 0.91, 0.50), IV 5.47 (1.52, 0.61, 1.35, 1.41, 0.58). Leg formula: 4213. Other characters as in male (Fig. 13). Copulatory openings close to each other; copulatory ducts long and with two branches, one horned and above the copulatory openings, and the other surrounded by itself longitudinally; the tubular spermatheca with a short and transverse fertilization ducts; bursae large and oval (Figs 15–16, 22–23).

Type materials examined. Holotype female, Qiyun Mountain (29°48.89'N, 118°02.07'E), Xiuning County, Anhui Province, May 1994, Yajun Xu leg. Deposited in MHBU.

Other material examined. China: Fujian Province, Wuyi Mountain National Natural Reserve (27°49'N, 50°21'E): 5 males and 8 females, Nankeng, 5 June 2013, Chi Jin leg.; 5 males and 7 females, Tongmu Village, 8 June 2013, Chi Jin leg.; 1 female, Moshikeng, 20 May 2004, Feng Zhang leg.; 1 female, Nankeng, 12 July 2011, Feng Zhang leg.; 2 females, Moshikeng, 11 July 2011, Feng Zhang leg.

Distribution. China (Fujian, Anhui).

\*

*Acknowledgements* – Thanks to the late Prof. Mingsheng Zhu and Dr. Jinyu Yang for collecting valuable specimens. We are grateful to Dr. Chi Jin for taking photos (13–19) and drawing figures (20–23). Dr. J. MacDermott kindly helped reviewing the manuscript. This work was supported by the National Natural Science Foundation of China (No. 31093430, 31372154), and in part by the Program of Ministry of Science and Technology of the Republic of China (2012FY110803) to Feng Zhang.

## REFERENCES

- DANKITTIPAKUL, P. & SINGTRIPOP, T. (2008) Spiders of the *Clubiona corticalis*-group from Thailand, with descriptions of three new species (Araneae: Clubionidae). *Zoological Studies* **47**(5): 644–656.
- DEELEMANN-REINHOLD, C. L. (2001) *Forest spiders of South East Asia: with a revision of the sac and ground spiders (Araneae: Clubionidae, Corinnidae, Liocranidae, Gnaphosidae, Prodidomidae and Trochanterriidae [sic])*. Brill, Leiden, 591 pp.
- DONDALE, C. D. & REDNER, J. H. (1976) A rearrangement of the North American species of *Clubiona*, with descriptions of two new species (Araneida: Clubionidae). *Canadian Entomologist* **108**: 1155–1165.
- LI, S. Q. & WANG, X. P. (2014) *Endemic spiders in China, version 1.0*. Available from <http://www.amaurobiidae.com/araneae/index.php>. (accessed 14 April 2014)
- LOHMANDER, H. (1944) Vorläufige Spinnennotizen. *Arkiv för Zoologi* **35**(A, 16): 1–21.



- MIKHAILOV, K. G. (1990) The spider genus *Clubiona* Latreille 1804 in the Soviet Far East, 1 (Arachnida, Aranei, Clubionidae). *Korean Arachnology* **5**(2): 139–175.
- MIKHAILOV, K. G. (1991) The spider genus *Clubiona* Latreille 1804 in the Soviet Far East, 2 (Arachnida, Aranei, Clubionidae). *Korean Arachnology* **6**(2): 207–235.
- MIKHAILOV, K. G. (1995) Erection of infrageneric groupings within the spider genus *Clubiona* Latreille, 1804 (Aranei Clubionidae): a typological approach. *Arthropoda Selecta* **4**(2): 33–48.
- MIKHAILOV, K. G. (2002) The spider genus *Clubiona* Latreille, 1804 (Aranei: Clubionidae) in the fauna of the former USSR: 2003 update. *Arthropoda Selecta* **11**: 283–317.
- MIKHAILOV, K. G. (2012) Reassessment of the spider genus *Clubiona* (Aranei, Clubionidae). *Vestnik Zoologii* **46**(2): 177–180.
- PLATNICK, N. I. (2014) *The world spider catalog, version 14.0*. American Museum of Natural History. Available from: <http://research.amnh.org/entomology/spiders/catalog/index.html>. (accessed 14 April 2014)
- WUNDERLICH, J. (2011) Extant and fossil spiders (Araneae). *Beiträge zur Araneologie* **6**: 1–640.
- XU, Y. J., YANG, J. Y. & SONG, D. X. (2003) Two new species of the genus *Clubiona* from Anhui, China (Araneae: Clubionidae). *Journal of Hebei University (Natural Science Edition)* **23**: 411–413.

Revised version received May 26, 2014, accepted August 13, 2014, published September 26, 2014