

DESCRIPTION OF *KARSTIA CORDATA* SP. NOV. (ARANEAE, THERIDIOSOMATIDAE) FROM CAVES IN CHONGQING, CHINA

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Abstract A new species, *Karstia cordata* sp. nov., is described and illustrated from caves of Chongqing, China. Type specimens are deposited in the Sichuan University Museum, Chengdu, China (SCUM).

Key words Taxonomy, theridiosomatid, *Karstia*, new taxon, cave spider, China.

The family Theridiosomatidae is a small spider group, mainly distributing in leaf litter, caves and under rocks. Up to the present, only 13 species in 8 genera are reported in China (Platnick, 2012). Before 1990's in last century, it is blank to study on theridiosomatids in China. Until to 1992, the first species, *Wendilgarda sinensis* was reported from Hainan Province (Zhu & Wang, 1992). After investigated cave fauna in Yunnan and Hunan, Song & Zhu (1994) recorded another theridiosomatid spider, *Wendilgarda assamensis* Fage, 1924. The third one, *Theridiosoma taiwanica* is described from Taiwan (Zhang, Zhu & Tso, 2006). The most fruitful study was to research the orb-web symphytognathoid spiders in the Gaoligongshan Region of Yunnan by the scholars' cooperation between American and Chinese, and plenty of new spider taxa were described and reported of which includes 1 new genus, 4 new recorded genera and 8 new species of theridiosomatid spiders (Miller, Griswold & Yin, 2009). The genus *Karstia* was erected by Chen in 2010 to accommodate *K. upperyangtzaica* from caves in Guizhou and Guangxi.

In Oct. 2010, with the purpose of investigating species diversity of cave spiders, we carried out expeditions to the Region of Chongqing and Eastern Sichuan. A considerable number of spider specimens were collected. By the careful examination, some specimens were identified to be the theridiosomatid spiders including a new species of genus *Karstia*. This is the first paper about the family Theridiosomatidae from Chongqing and Eastern Sichuan. Type specimens are deposited in the Sichuan University Museum, Chengdu, China (SCUM). Measurements are in millimeter.

Karstia Chen, 2010

Type species by original designation *K. upperyangtzaica* Chen, 2010: 3, figs 1 – 14.

Karstia cordata sp. nov. (Figs 1 – 18)

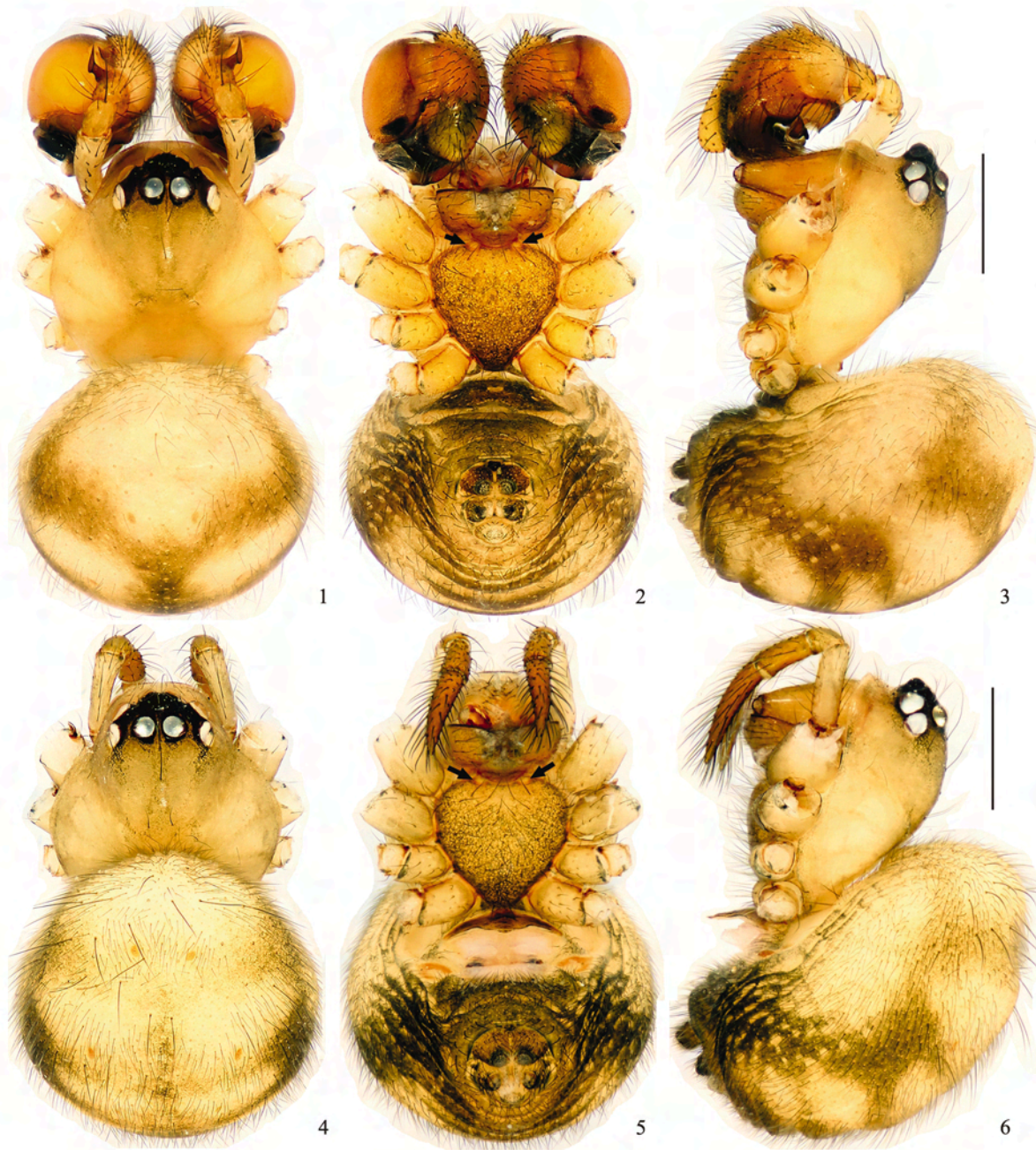
Diagnosis. This new species is similar to *Karstia upperyangtzaica* Chen, 2010, but can be distinguished by the presence of a embolic lobe (absent in the latter), the non-furcate embolic apophysis (multi-furcate in the latter), the rasper-like surface of median apophysis (smooth in the latter) in male pedipalp (Figs 7 – 13), and by the heart-shaped epigynal plate (subtriangular in the latter), the wide and long spermathecae (narrow and short in the latter) in female (Figs 16 – 18).

Description. Male (holotype), total length 1.96. Prosoma length 0.95, width 0.96, maximal height 0.46. Opisthosoma length 1.04, width 1.23, height 1.52. Dorsal shield of prosoma pyriform, yellow, smooth, thoracic groove indistinct. Eight eyes round, white, in two rows, ALE and PLE contiguous, AER and PER slightly procurved. Ocular base black. Cephalic pars covered with few long setae in midline. Clypeus height 0.27, slightly concaved. Chelicerae yellow-brownish. Endites subquadrate, with serrula. Labium semicircular, wider than long. Sternum length 0.50, width 0.54, heart-shaped, brown yellow, with a pair of pit organs on prolateral margin. Femora pale yellow, others yellow brown. Femur I with three distal spines, and femur II with one distal spine. Patellae I – IV with a distal dorsal spine. Tibia I with a proximal, three distal spines and five trichobothria, tibia II with a proximal, two distal spines and five trichobothria, Tibiae III and IV with a proximal spine and six trichobothria. Metatarsi I – III only with one trichobothrium. Leg measurements: I 4.63 (1.46, 0.48, 1.16, 1.07, 0.46); II 3.71 (1.18, 0.43, 0.84, 0.86, 0.40); III 2.47 (0.80, 0.30, 0.50, 0.57, 0.30); IV 2.93 (0.98, 0.32, 0.63, 0.70, 0.30). Leg formula: 1-2-4-3. Abdomen pale yellow, dorsally round and laterally ovoid, with

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Figs 1–6. *Karstia cordata* sp. nov., holotype and female paratype, habitus. 1–3. Male. 4–6. Female. 1, 4. Dorsal view. 2, 5. Ventral view. 3, 6. Lateral view. Scale bars = 0.5 mm.

brown strip. Ventral cuticle rugose, black. Colulus present, black. Spinnerets conical, black brown, the anteriors larger than the posteriors, the medians smallest. Anal tubercle large, pale (Figs 1–3).

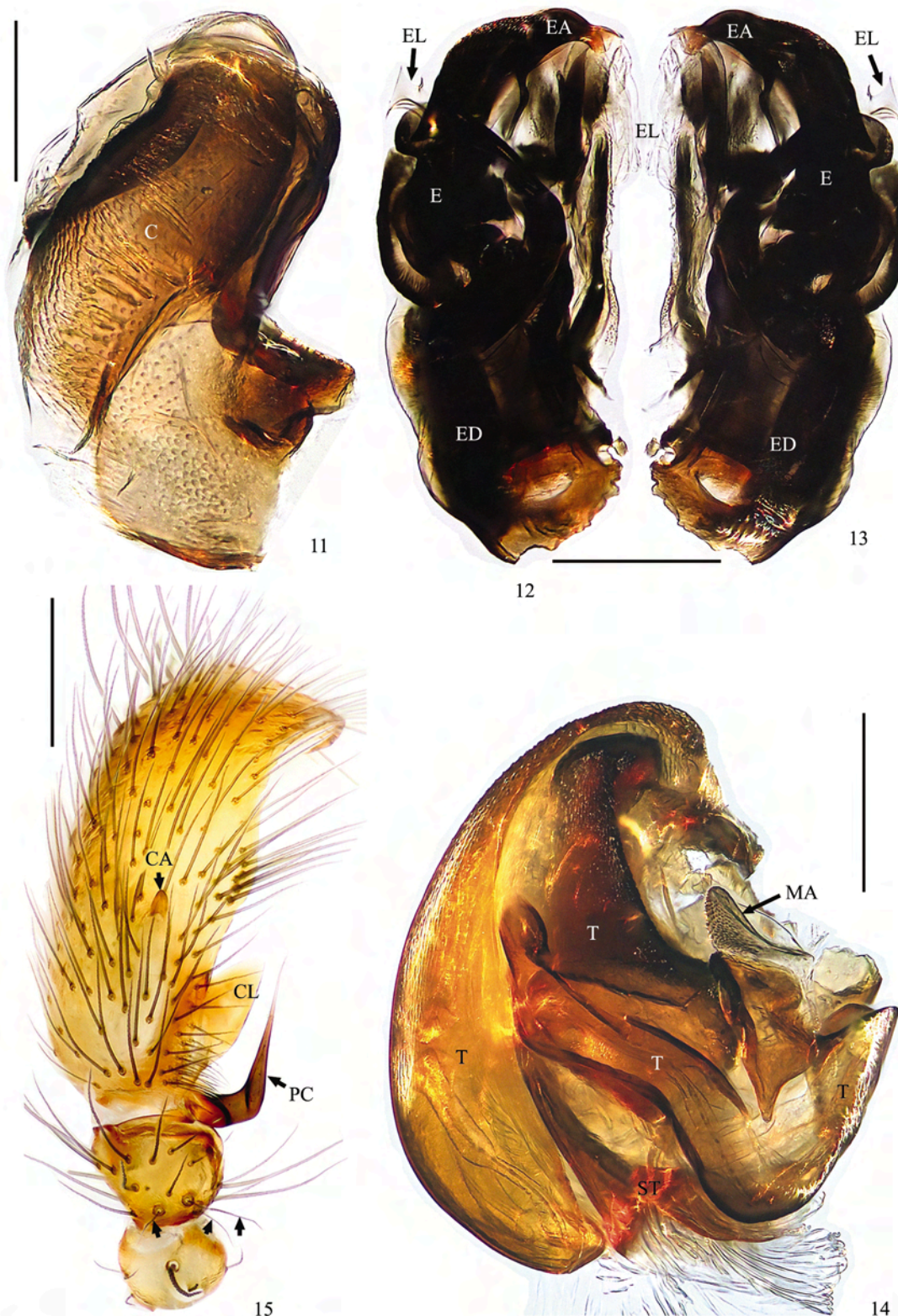
Pedipalp large, strongly sclerotized (Figs 7–10). Patella bears a long spine. Three trichobothria on tibia dorsally (Fig. 15). Cymbium covered with a cluster of distal long setae, with a dorsal cymbial apophysis, a sclerotized “L”-shaped paracymbium, and a cymbial lobe (Fig. 15). The structure of pedipalpal bulb complex. Tegulum large, yellow, swollen and granulated. Subtegulum small and smooth. Median apophysis cuneated, modified with tiered dents (Fig.

14). Conductor very large, surface granulated and sculptured, enveloping the complicated embolus. Embolic division strongly sclerotized, attaching a translucent embolic lobe. Embolic apophysis with velumen, and the course of ejaculatory duct is intricate (Figs 11–13).

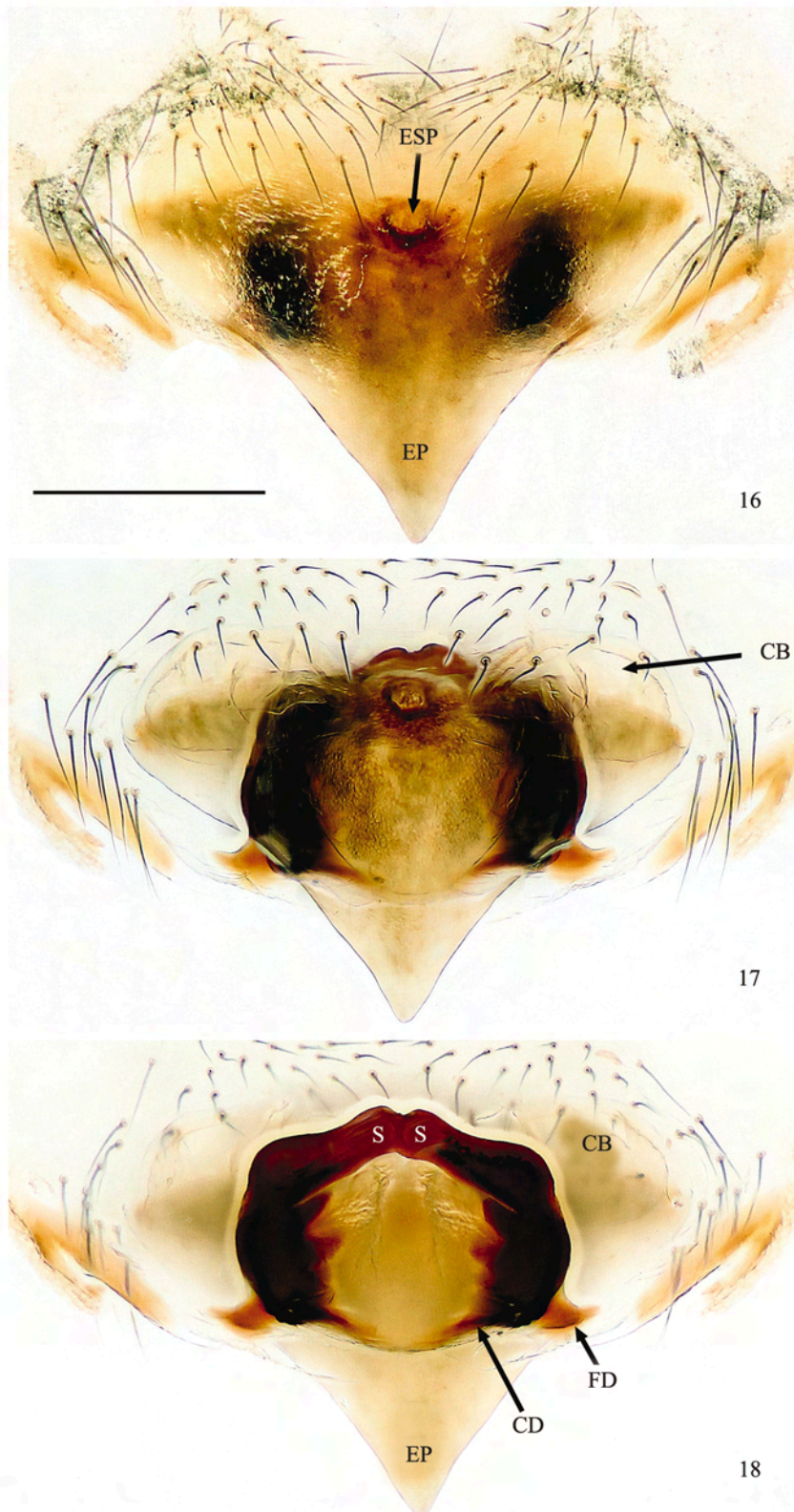
Female. Total length 1.93 (one of paratypes). Prosoma length 0.93, width 0.98, maximal height 0.45, Opisthosoma length 1.21, width 1.27, height 1.43. Clypeus height 0.16. Sternum length 0.52, width 0.55. Coloration and modification of dorsal shield of prosoma, ocular pattern, mouthparts, sternum, legs and abdomen nearly same as in male.



Figs 7–10. *Karstia cordata* sp. nov., holotype, left pedipalp. 7. Ventral view. 8. Dorsal view. 9. Prolateral view. 10. Retrolateral view. Abbrs. C = conductor, CA = cymbial apophysis, CL = cymbial lobe, EA = embolic apophysis, MA = median apophysis, PC = paracymbium, ST = subtegulum, T = tegulum. Scale bars = 0.2 mm.



Figs 11 – 15. *Karstia cordata* sp. nov., holotype, pedipalpal pars (lactic acid-treated). 11. Conductor, dorsal view. 12. Embolic division, dorsal view. 13. Ditto, ventral view. 14. Pedipalpal bulb (omitted embolic division), ventral view. 15. Pedipalpal cymbium, tibia and patella, dorsal view. Abbrs. C = conductor, CA = cymbial apophysis, CL = cymbial lobe, E = embolus, EA = embolic apophysis, ED = ejaculatory duct, EL = embolic lobe, MA = median apophysis, PC = paracymbium, ST = subtegulum, T = tegulum. Scale bars; 11, 14 – 15 = 0.2 mm, 12 – 13 = 0.1 mm.



Figs 16 - 18. *Karstia cordata* sp. nov., female paratype, epigynum. 16. Epigynum (untreated), ventral view. 17. Ditto (lactic acid-treated), ventral view. 18. Vulva, dorsal view. Abbrs. CB = copulatory bursae, CD = copulatory ducts, EP = epigynal plate, ESP = epigynal sclerotized pit, FD = fertilization ducts, S = spermathecae. Scale bar = 0.2 mm.

Leg measurements: I 4.11 (1.38, 0.46, 0.91, 0.93, 0.43); II 3.40 (1.11, 0.43, 0.70, 0.77, 0.39); III 2.38 (0.77, 0.32, 0.45, 0.53, 0.31);

IV 3.03 (1.04, 0.34, 0.63, 0.70, 0.32). Leg formula: 1-2-4-3. The chaetotaxy and number of legs same as in male. Colulus smaller than in male. Anal

tubercle small and pale (Figs 4–6).

Genital area wide, covered with sparse setae at foreside (Fig. 16). Epigynal plate large, smooth, heart-shaped and translucent, with a scape beyond posterior margin. Copulatory opening rounded, sclerotized, situates epigynal plate mesially. Vulva simple, spermathecae contacted each other at distally, attached a pair of translucent copulatory bursae. Copulatory ducts short, and sclerotized distinctly, originated from the base of spermathecae. Fertilization ducts short, weakly sclerotized, below spermathecae, and its distal part converged at epigynal posterior margin. Spiracles very large, located at epigynal posteromargin laterally (Figs 17–18).

Holotype ♂ (SCUM), Xiaodong Cave (29.53°N, 107.85°E; alt. 1 050 m), Tiansheng Village, Tudi Town, Wolong County, Chongqing City, China, 17 Oct. 2010, leg. LIN Yu-Cheng and DOU Liang. Paratypes: 1 ♂, 3 ♀♀ (SCUM), same data as holotype; 2 ♂♂, 10 ♀♀ (SCUM), Duozi Cave (30.29°N, 106.77°E), Yanjinggou Village, Yanghe Town, Huaying City, Sichuan Province, China, 16 Oct. 2010, leg. LIN Yu-Cheng and DOU Liang.

Etymology. The specific name of this new species derived from Latin word “*cordatus*” = cordiform, refers to the shape of epigynal plate in female; adjective.

Natural history. The spider species are found under stones and at lacuna of rock wall in the dark

area of caves.

Distribution. Known only from the type locality.

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中国重庆洞穴喀蛛属一新种记述 (蜘蛛目, 球体蛛科)

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摘要 记述了来自中国重庆洞穴内的球体蛛科喀蛛属 1 新种, 心形喀蛛 *Karstia cordata* sp. nov., 模式标本保存在四川大学自然博物馆 (SCUM)。

心形喀蛛, 新种 *Karstia cordata* sp. nov. (图 1~18)

新种与上扬子喀蛛 *K. upperyangtzaica* Chen, 2010 相似, 但它们的区别在于: 前者具 1 插入器附片, 后者缺失; 前者插入器突不分叉, 后者多分叉; 前者中突表面呈具细齿锉刀状, 后者光滑; 前者雌性生殖板呈心形, 后者为近三角形, 前者纳精

囊宽且长, 后者窄而短。

正模 ♂, 产自中国重庆市武隆县土地乡天生村硝洞 (29.53°N, 107.85°E; 海拔 1 050 m), 2010-10-17。副模: 1 ♂, 3 ♀♀, 采集信息同正模; 2 ♂♂, 10 ♀♀, 产自四川省华蓥市洋河镇盐井沟村垱子石洞 (30.29°N, 106.77°E), 2010-10-16, 均为林玉成和窦亮采集。

词源: 新种种名源自拉丁词语 *cordatus* (心形的), 意指该种雌性生殖板形状; 形容词。

关键词 分类学, 球体蛛, 喀蛛属, 新分类单元, 洞穴蜘蛛, 中国.
中图分类号 Q959.226

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