

Two New Records of Sac Spiders including a New Species (Araneae: Clubionidae) from Korea

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ABSTRACT

The genus *Clubiona* Latreille, 1804 is the most diverse and largest one in the family Clubionidae Wagner, 1887. Twenty-nine species of the genus have been described in various ecosystems from Korea to date. *Clubiona semicircularis* Tang, Song and Zhu, 2005 which was formerly only known in China and *Clubiona ansa* n. sp. were collected with a sweep net on the foliage of the shrubs in mixed forests from mountains and agricultural landscape during a seasonal survey of the spider fauna in Korea. This study describes these two species with a diagnosis, measurements, and morphological illustrations. In addition, the female of *C. semicircularis* is described with a diagnosis for the first time from the present study.

Keywords: *Clubiona semicircularis*, *Clubiona ansa* n. sp., Clubionidae, description, taxonomy

INTRODUCTION

Spiders in the family Clubionidae Wagner, 1887 are often called sac spiders and are usually found on the green foliage in various kind of forests and on the crops in agricultural ecosystem (Kim et al., 2016). This family consists of 656 species belonging to 17 genera worldwide (World Spider Catalog, 2021). Currently, two genera, *Clubiona* Latreille, 1804 and *Bucliona* Benoit, 1977, are recorded in Korea. The genus *Clubiona* is the most diverse and largest one comprising 517 species within the family and 29 species of the genus have been described in various ecosystems from Korea to date (Kim, 2019; World Spider Catalog, 2021). During a seasonal survey of the spider fauna in mountainous and agricultural terrain, *Clubiona semicircularis* Tang, Song and Zhu, 2005 which was formerly only known in China and *Clubiona ansa* n. sp. were collected with a sweep net on the foliage of the shrubs in the mixed forests from National Parks and agricultural landscape. This study describes these two species with a diagnosis, measurements, and morphological illustra-

tions. In addition, the female of *C. semicircularis* is described for the first time from the present study.

MATERIALS AND METHODS

External morphology was examined and illustrated using a stereoscopic dissecting microscope (LEICA, S8APO). Habitus photographs were taken with a CANON 650D with 60 mm macro-lens. Measurements of body parts were made with an ocular micrometer and are recorded in millimeters. Leg and palp (left) measurements are given as leg number, total length (femur, patella, tibia, metatarsus, tarsus).

Abbreviations used are as follows: AER, anterior eye row; ALE, anterior lateral eye; AME, anterior median eye; PER, posterior eye row; PLE, posterior lateral eye; PME, posterior median eye. The examined specimens of this study were deposited in the collection of the National Institute of Biological Resources (NIBR), Korea.

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SYSTEMATIC ACCOUNTS

Order Araneae Clerck, 1757

Family Clubionidae Wagner, 1887

Genus *Clubiona* Latreille, 1804

Type species: *Clubiona pallidula* (Clerck, 1757).

Diagnosis. For detailed diagnosis and description, see Paik (1990a) and Tang, Song and Zhu (2005).

¹**Clubiona semicircularis* Tang, Song and Zhu, 2005
(Fig. 1)

Clubiona semicircularis Tang, Song and Zhu, 2005: 89, figs. 13A–C.

Material examined. Korea: 1♂, Gangwon-do: Hongcheon-gun, Nae-myeon, Unduryeong-ro, Mt. Gyebangsan, 37°44'04"N, 128°24'28"E, alt. 731 m, 7 Jul 2018; 2♂♂ 2♀♀, Gyeonggi-do: Gapyeong-gun, Seorak-myeon, Darakjae-ro, Mt. Hwayasan, 37°40'01"N, 127°26'41"E, alt. 292 m, 26 Aug 2002; 1♀, Jeollanam-do: Jangseong-gun, Bukha-myeon, Baekyang-ro, Mt. Naejangsan, 36°26'44"N, 126°53'20"E, alt. 284 m, 27 Jun 2018; 1♂ and 2♀♀, Jangseong-gun, Bukha-myeon, Baekyang-ro, Mt. Naejangsan, 36°26'35"N, 126°53'14"E, alt. 379 m, 15 Jul 2019; 1♂, Jangseong-gun, Bukha-myeon, Baekyang-ro, Mt. Naejangsan, 36°25'42"N, 126°52'46"E, alt. 136 m, 20 Jun 2020; 1♀, Jangseong-gun, Bukha-myeon, Baekyang-ro, Mt. Naejangsan, 35°25'46"N, 126°52'47"E, alt. 146 m, 30 Jul 2020; 1♂, Chungcheongbuk-do: Danyang-gun, Danyang-eup, Suchonri, Mt. Sobaekgsan, 36°56'18"N, 128°26'21"E, alt. 1,092 m, 25 May 2020, leg. S.T. Kim, S.Y. Lee and C.M. Jang.

Diagnosis. For detailed diagnosis for male, see Tang, Song and Zhu (2005). The females of *C. semicircularis* is most similar to that of *C. microsapporensis* Mikhailov, 1990 in the body appearance, but can be easily distinguished from the latter by the size of the bursa, the shape of the spermatheca, the location of the copulatory duct and copulatory opening: females of *C. semicircularis* with a large bursa, a very long and untwisted spermatheca, a copulatory duct situated posteromedial part of the bursa, and a copulatory opening situated in the atrium (Fig. 1H), *versus* a small bursa, a bean-like and twisted spermatheca, a copulatory duct situated under the bursa, and a copulatory opening conjugated to the epigastric furrow in *C. microsapporensis* (Mikhailov, 1990: 158, figs. 48, 49; Mikhailov, 2003: 301, figs. 39, 40).

Description. Female: Total length 7.16 (habitus). Cara-

pace: 3.22 long/2.30 wide, reddish brown, ovoid, longer than wide, cervical and radial furrows distinct, longitudinal fovea needle-shaped (Fig. 1A). Eyes: ALE 0.17, AME 0.14, PLE 0.14, PME 0.14, ALE-AME 0.12, AME-AME 0.16, PLE-PME 0.26, PME-PME 0.40, ALE-PLE 0.15, AME-PME 0.18, AER 1.01, PER 1.32, eight eyes in two rows, AER slightly recurved and PER almost straight from above, AER shorter than PER (Fig. 1C). Chelicera: 1.15 high/0.67 wide, brown with six promarginal teeth and two retromarginal teeth (Fig. 1D). Endite: 1.16 long/0.60 wide, brown. Labium: 0.70 long/0.38 wide, brown. Sternum: 2.13 long/1.02 wide, dusky yellowish brown, subcordate, longer than wide, margin dark, anteromedian end truncated, posterior end slightly pointed (Fig. 1F). Legs: I 8.07 (2.38, 1.17, 2.20, 1.52, 0.80), II 8.50 (2.50, 1.20, 2.30, 1.65, 0.85), III 7.10 (2.10, 1.55, 0.97, 1.88, 0.60), IV 10.73 (2.97, 1.30, 2.45, 3.16, 0.85), yellowish brown, long and strongly developed, no annuli (Fig. 1A), leg spination on dorsal surface of femur; I 1-1-1, II 1-1-1, III 1-3-3, IV 1-3-3, leg formula VI-II-I-III. Abdomen: 4.00 long/2.24 wide, pale reddish brown, long ovoid, longer than wide, cardiac pattern slightly dark (Fig. 1A). Palp: 3.46 (1.00, 0.45, 0.60, -, 0.56). Epigyne (Fig. 1G, H): epigynal plate subequal in length and width, atrium large and round, bursae and spermathecae visible through epigynal plate in ventral view; bursa elliptical, spermatheca long and curved with a beak-like and large spermathecal head, copulatory duct long and situated posteromedial part of the bursa, fertilization duct indistinct.

Male: Total length 6.72 (habitus). Carapace: 3.14 long/2.20 wide, reddish brown, ovoid, longer than wide, cervical and radial furrows distinct, longitudinal fovea needle-shaped (Fig. 1B). Eyes: ALE 0.23, AME 0.20, PLE 0.22, PME 0.18, ALE-AME 0.12, AME-AME 0.16, PLE-PME 0.26, PME-PME 0.45, ALE-PLE 0.15, AME-PME 0.18, AER 1.21, PER 1.46, eight eyes in two rows, AER slightly recurved and PER almost straight from above, AER shorter than PER. Chelicera: 1.85 high/0.60 wide, dark reddish brown with five promarginal teeth and four retromarginal teeth (Fig. 1E). Endite: 1.24 long/0.51 wide, dark reddish brown. Labium: 0.67 long/0.40 wide, dark reddish brown. Sternum: 1.55 long/1.07 wide, dusky yellowish brown, subcordate, longer than wide, margin dark, anteromedian end truncated, posterior end slightly pointed. Legs: I 9.43 (2.60, 1.20, 2.30, 2.20, 1.13), II 9.75 (2.63, 1.17, 2.80, 2.10, 1.05), III 8.65 (2.30, 1.07, 2.50, 2.10, 0.68), IV 10.88 (3.10, 1.10, 2.45, 3.33, 0.90), yellowish brown, long and strongly developed, no annuli (Fig. 1B), leg spination on dorsal surface of femur; I 1-3-3, II 1-1-3, III 1-2-1-3, IV 1-2-1-3, leg formula VI-II-I-III. Abdomen: 4.00 long/2.24 wide, dark reddish

Korean name: ¹*산염낭거미(신칭)

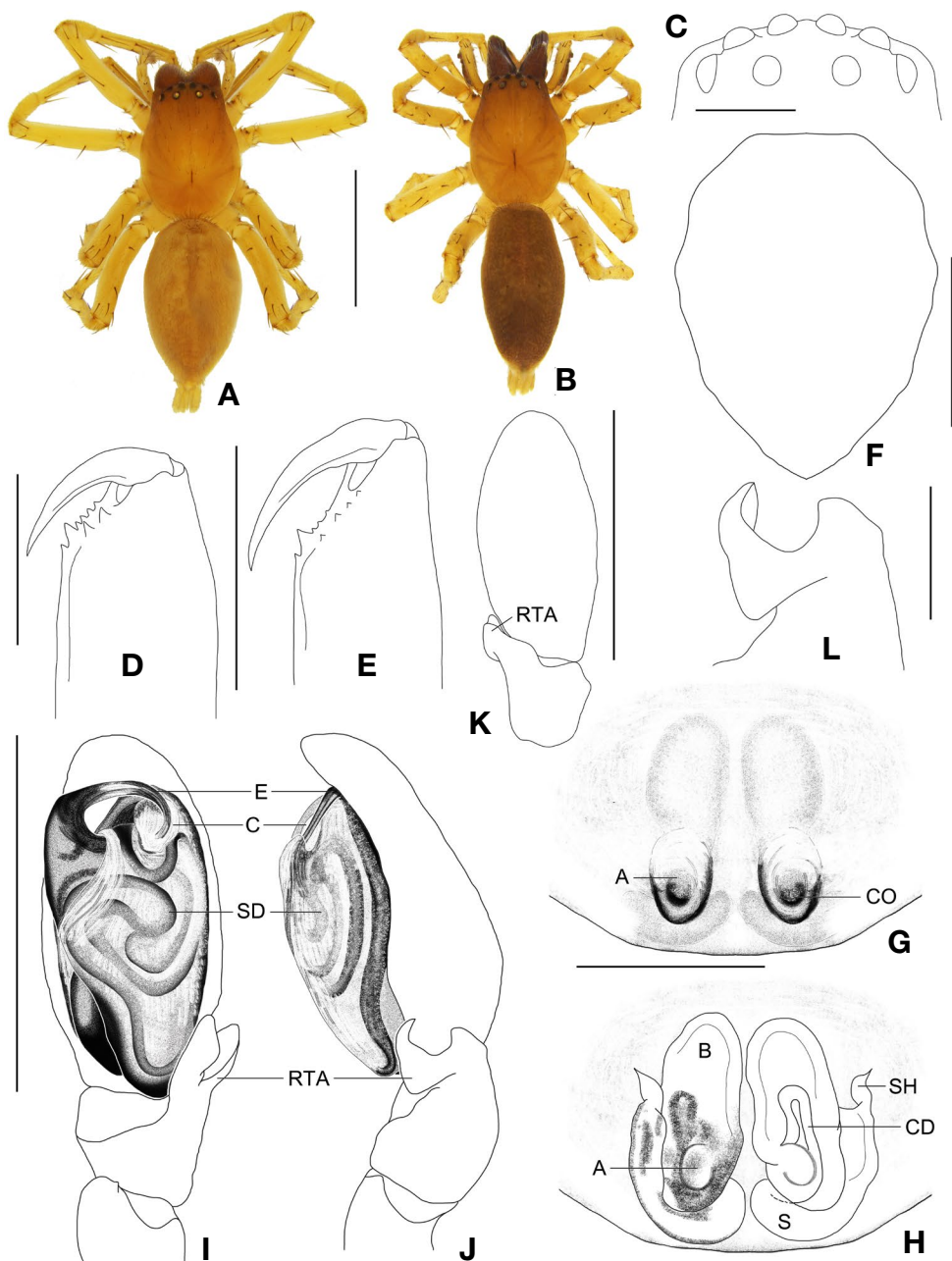


Fig. 1. *Clubiona semicircularis* Tang, Song & Zhu, 2005. A, Habitus in dorsal view, female; B, Ditto, male; C, Eye area from above, female; D, Chelicera, female; E, Ditto, male; F, Sternum, female; G, Epigyne in ventral view; H, Internal genitalia in ventral view; I, Male palp (left) in ventral view; J, Ditto in retrolateral view; K, Ditto in dorsal view; L, Retrolateral tibial apophysis in retrolateral view (A, atrium; B, bursa; C, conductor; CD, copulatory duct; CO, copulatory opening; E, embolus; SD, sperm duct; RTA, retrolateral tibial apophysis; S, spermatheca; SH spermathecal head). Scale bars: A, B=3.0 mm, C-E=0.5 mm, F, I-K=1.0 mm, G, L=0.2 mm.

brown, long ovoid, longer than wide, cardiac pattern thin and light (Fig. 1B). Palp (Fig. 1I-L): 3.13 (1.13, 0.46, 0.54, -, 1.00), embolus with a broad base and a strongly curved tip, embolus tip wrapped in the conductor, conductor round and membranous, seminal duct characteristically curved, retro-

lateral tibial apophysis large and strongly developed, ventral ramus larger than dorsal ramus of the retrolateral tibial apophysis (ventral ramus hook-like with an expanded lower part and dorsal ramus flat hill-like).

Distribution. Korea (new record), China.

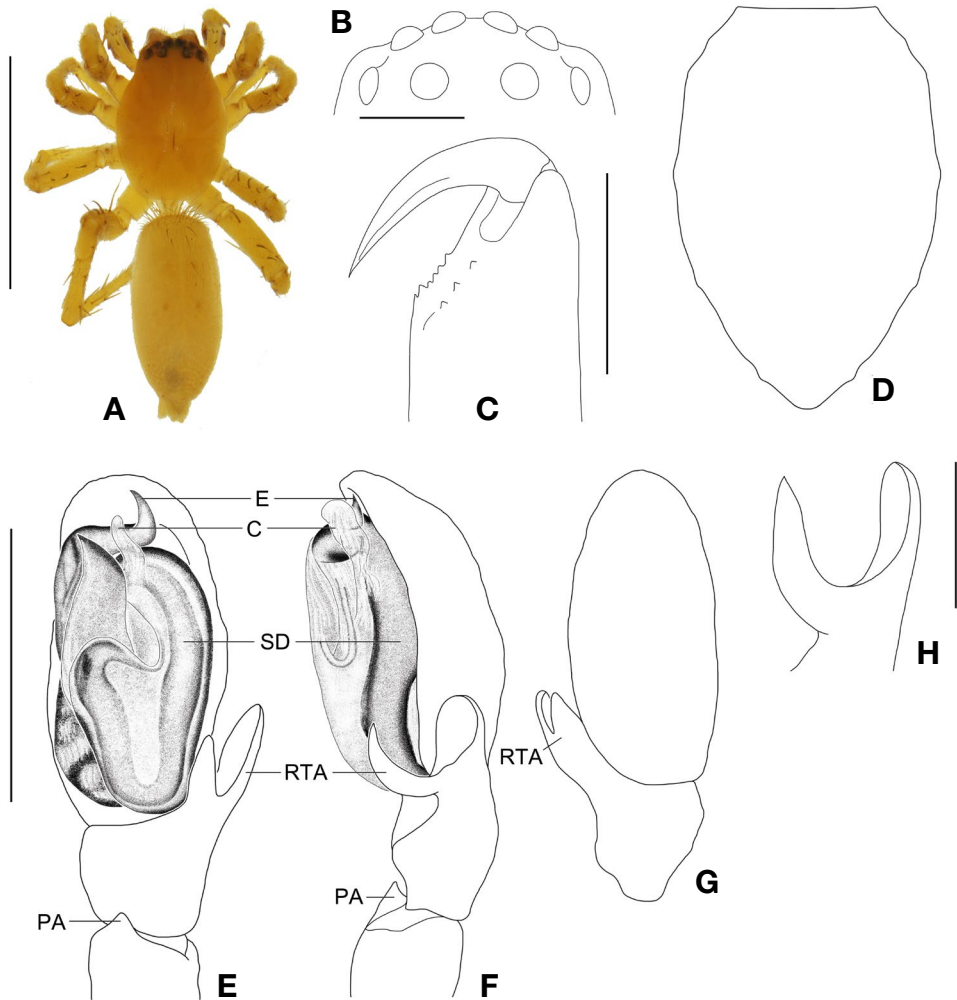


Fig. 2. *Clubiona ansa* n. sp., holotype male. A, Habitus in dorsal view; B, Eye area from above; C, Chelicera; D, Sternum; E, Palp (left) in ventral view; F, Ditto in retrolateral view; G, Ditto in dorsal view; H, Retrolateral tibial apophysis in retrolateral view (C, conductor; E, embolus; SD, sperm duct; PA, patellar apophysis; RTA, retrolateral tibial apophysis). Scale bars: A=2.0 mm, B, D-F=0.3 mm, C=0.2 mm, H=0.03 mm.

Remarks. The species was collected with a sweep net between shrubs of mixed forest in the mountainous terrain.

¹**Clubiona ansa* n. sp. (Fig. 2)

Etymology. The species name is derived from the Latin noun ‘ansa’ meaning hook, referring to the shape of the hook-like embolus in the male palp.

Type. Holotype: Korea: ♂, Gangwon-do: Hongcheon-gun, Nam-myeon, Weolcheon-ri, 37°37'42"N, 127°47'07"E, alt. 265 m, 5 May 2020, leg. S.T. Kim and C.M. Jang.

Diagnosis. The new species is most similar to *Clubiona*

japonicola Bösenberg and Strand, 1906 in the body appearance, but can be easily distinguished from the latter by the shape of the embolus, conductor, retrolateral tibial apophysis, and the number of the cheliceral teeth: male of *Clubiona ansa* n. sp. have a thick embolus with a curved tip, a distinct finger-like conductor, a ventral ramus slender with a pointed tip and dorsal ramus broad with a blunt tip of the retrolateral tibial apophysis, and six promarginal teeth and three retromarginal teeth on the chelicera, *versus* a slender embolus with a twisted tip, an indistinct conductor, a ventral ramus slender with a branched tip and dorsal ramus narrow with a pointed tip of the retrolateral tibial apophysis, and five pro-

Korean name: ¹*갈고리염낭거미(신칭)

marginal teeth (2 large and 3 small) and two large retromarginal teeth on the chelicera in *C. japonicola* (Paik, 1990b: 65, figs. 2–5, 11; Wang et al., 2018: 325, fig. 10C–D).

Description. Holotype male: Total length 3.56 (habitus). Carapace: 1.50 long/1.00 wide, dark yellowish brown, ovoid, longer than wide, cervical and radial furrows distinct, longitudinal fovea needle-shaped (Fig. 2A). Eyes: ALE 0.11, AME 0.09, PLE 0.09, PME 0.09, ALE-AME 0.02, AME-AME 0.02, PLE-PME 0.07, PME-PME 0.18, ALE-PLE 0.02, AME-PME 0.07, AER 0.56, PER 0.71, eight eyes in two rows, AER slightly recurved and PER almost straight from above, AER shorter than PER (Fig. 1B). Chelicera: 0.53 high/0.23 wide, dark yellowish brown with six small promarginal teeth and three small retromarginal teeth (Fig. 2C). Endite: 0.47 long/0.18 wide, dark yellowish brown. Labium: 0.30 long/0.16 wide, dark yellowish brown. Sternum: 0.68 long/0.52 wide, yellowish brown, subcordate, longer than wide, anteromedian end truncated, posterior end blunt (Fig. 2D). Legs: I 3.29 (0.97, 0.46, 0.88, 0.58, 0.40), II 3.10 (0.95, 0.45, 0.83, 0.57, 0.30), III 2.76 (0.85, 0.38, 0.56, 0.67, 0.30), IV 4.36 (1.33, 0.50, 0.93, 1.20, 0.40), dark yellowish brown, strongly developed, no annuli (Fig. 2A), leg spination on dorsal surface of femur; I 1-1, II 1-1-3, III 1-1-3, IV 1-1-3, leg formula IV-I-II-III. Abdomen: 1.87 long/1.13 wide, yellowish brown, cylindrical, longer than wide, no particular patterns, 2 pairs of muscle impressions visible (Fig. 2A). Palp (Fig. 2E–H): 1.36 (0.35, 0.13, 0.10, -, 0.38), embolus with a broad base and a strongly curved tip, embolus tip oriented upward, conductor finger-like and membranous, seminal duct thick and simply curved, retrolateral tibial apophysis large, U-like, and strongly developed, ventral ramus and dorsal ramus of the retrolateral tibial apophysis subequal in length and width (ventral ramus slender with a pointed tip and dorsal ramus broad with a blunt tip), patellar apophysis triangular and slightly elevated.

Female: Unknown.

Distribution. Korea (Hongcheon-gun, Gengwon-do).

Remarks. The species was collected with a sweep net between shrubs of mixed forest in the hilly terrain of agricultural landscape.

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CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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