

Descriptions of *Clubiona bakurovi* and *Otacilia ansula* sp. nov. (Araneae: Clubionidae and Phrurolithidae) from South Korea

Chang Moon Jang¹, Sue Yeon Lee², Yang Seop Bae¹, Seung Tae Kim^{2,*}

¹Division of Life Sciences, College of Life Sciences and Bioengineering, Incheon National University, Incheon 22012, Korea

²Life and Environment Research Institute, Konkuk University, Seoul 05029, Korea

ABSTRACT

The spider fauna of mountains, including national parks, in Korea was intensively surveyed in 2018–2019. During the seasonal surveys, males of *Clubiona bakurovi* Mikhailov, 1990 (family Clubionidae Wagner, 1887) and *Otacilia ansula* sp. nov. (family Phrurolithidae Banks, 1892) were collected from shrub foliage and leaf litter, respectively, in mountainous mixed forests. The males of *Otacilia ansula* sp. nov. can be easily distinguished from those of other its congeners by the slender and hook-shaped retrolateral tibial apophysis, ovoid distal tegular apophysis, and one dorsal spine on the femur with seven pairs of ventral spines on the tibia of leg I. This study provides descriptions of these two species with diagnosis, measurements, and morphological photographs.

Keywords: *Clubiona bakurovi*, *Otacilia ansula* sp. nov., Clubionidae, Phrurolithidae, description, taxonomy

INTRODUCTION

The spiders in the families Clubionidae Wagner, 1887 and Phrurolithidae Banks, 1892 occupy different ecological habitats. The spiders in Clubionidae are usually found on green foliage in natural and agricultural ecosystems (Kim et al., 2016); whereas those in Phrurolithidae, the hunting spiders, live in leaf litter, bamboo shells, woody debris on the forest floor, or under stones or tree bark (Liu et al., 2019). *Clubiona* Latreille, 1804 is the largest clubionid genus with 524 described species worldwide and *Otacilia* Thorell, 1897 is the most diverse genus in the family Phrurolithidae, comprising 121 species in the world (World Spider Catalog, 2023). Moreover, 31 *Clubiona* and 2 *Otacilia* species have been described from Korea to date (Kim, 2019; Jang et al., 2021; World Spider Catalog, 2023). The spider fauna of Korea was intensively surveyed in 2018 and 2019, covering several mountainous landscapes and national parks. The *C. bakurovi* Mikhailov, 1990 was collected from shrub foliage. Although *C. bakurovi* has been reported from the northern part of East Asia, particularly in Russia, China, and North Korea (Cheongjin-si, Hamgyeongbuk-do) (Mikhailov, 1997), this study reported it in South Korea for the first time and is the southernmost

geographical record of the species. Furthermore, the males of *O. ansula* sp. nov. was collected using pitfall traps from the leaf litter of mountainous mixed forest. Males of *Otacilia* resembles *Phrurolithus* C. L. Koch, 1839 in their palpal organ shape; however, they are easily distinguished by the strong ridge-like extension with a depression on the palpal femur, the shape of the retrolateral tibial apophysis, and the length (half of tegular width) of embolus (Liu et al., 2022). This study describes these two species with a diagnosis, measurements, and morphological photographs.

MATERIALS AND METHODS

All specimens were preserved in 98% ethyl alcohol and external morphology was examined under a Leica S8APO (Singapore) stereomicroscope. Images were captured with a Tucsen Dhyana 400DC digital camera (China) mounted on a Leica S8APO and assembled using Helicon Focus 8.2.0 image stacking software (Khmelik et al., 2006). Measurements of body parts were made with an ocular micrometer and are recorded in millimeters. Leg and palp measurements are shown as: Total length (femur, patella, tibia, metatarsus, tar-

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***To whom correspondence should be addressed**

Tel: 82-2-2049-6163, Fax: 82-2-450-1094
E-mail: stkim2000@hanmail.net

sus). Morphological terminology follows Mikhailov (1990) and Liu et al. (2020). Examined and type specimens are deposited in the National Institute of Biological Resources, Incheon (NIBR), Korea. The following abbreviations are used in the descriptions: ALE, anterior lateral eye; AME, anterior median eye; PLE, posterior lateral eye; PME, posterior median eye; AME–ALE, distance between AME–ALE; AME–AME, distance between AMEs; AME–PME, distance between AME–PME; PME–PLE, distance between PME–PLE; PME–PME, distance between PMEs; ALE–PLE, distance between ALE–PLE; AER, anterior eye row; PER, posterior eye row in eye region; d, dorsal surface; p, prolateral surface; r, retrolateral surface; v, ventral surface in leg spination.

SYSTEMATIC ACCOUNTS

Order Araneae Clerck, 1757
 Family Clubionidae Wagner, 1887
 Genus *Clubiona* Latreille, 1804
 Type species. *Clubiona pallidula* (Clerck, 1757).

Clubiona bakurovi Mikhailov, 1990

(Fig. 1)

Clubiona bakurovi Mikhailov, 1990: 163, f. 61–65; Zhang, 1991: 33, f. 15–16; Mikhailov, 1995: 40, f. 46; Song, Zhu & Chen, 1999: 415, f. 247E–F.

Material examined. Korea: ♂, Gyeonsangbuk-do, Yeongju-si, Punggi-eup, Samga-ri, Mt. Sobaeksan National Park, 36.949242N, 128.498825E, alt. 1,022 m, 25 May 2019, S.T. Kim & S.Y. Lee leg.

Description. Male. Total length 6.57. Carapace: 2.95 long/2.10 wide. Eyes: AER 0.68, PER 0.91, ALE 0.18, AME 0.14, PLE 0.16, PME 0.14, ALE–PLE 0.07, AME–ALE 0.04, AME–AME 0.06, AME–PME 0.14, PME–PLE 0.16, PME–PME 0.22. Chelicera: 1.07 long/0.48 wide. Endite: 0.84 long/0.40 wide. Labium: 0.48 long/0.34 wide. Sternum: 1.55 long/0.94 wide. Legs: I 7.65 (2.25, 3.14, 1.44, 0.82) / II 8.16 (2.45, 3.26, 1.55, 0.90)/III 7.27 (2.20, 2.50, 1.87, 0.70)/IV 10.59 (3.14, 3.48, 3.10, 0.87). Abdomen: 3.20 long/1.72 wide. Palp: 3.11 (0.95, 1.13, -, 1.03).

Habitus as in Fig. 1A, B. Carapace ovoid, yellowish brown, longer than wide, cervical and radial furrows indistinct, longitudinal fovea needle-shaped (Fig. 1A). Eight eyes, AER recurved and PER straight, PER longer than AER (Fig. 1C). Chelicera strongly developed with 7 promarginal teeth (5 proximal small, middle large, and distal medium) and 3 retro-marginal teeth (proximal small, middle and distal large). Sternum ovoid, pale yellowish brown, margin dark and covered

sparsely with long blackish brown hairs, posterior end blunt and slightly protruding between the coxae of leg IV (Fig. 1D). Legs long and strongly developed, yellowish brown, no annuli, leg spination; I (femur 1-1-1d, 0-0-1r/tibia 2-2-0v/metatarsus 2-0-0), II (femur 1-1-1d, 0-0-1r/tibia 2-2-0v/metatarsus 2-0-0v), III (femur 1-1-3d/tibia 1-1p, 1-1r, 1-1-0v/metatarsus 0-1-0d, 1-0-1p, 1-1-1r, 2-0-2v), IV (femur 1-1-3d/tibia 1-1p, 1-1r, 1-1-1v/metatarsus 0-1-0d, 1-1-1p, 1-1-1r, 1-1-0-1-0-0-2v), leg formula IV-II-I-III (Fig. 1B). Palp: embolus with slender and pointed tip, and thick broad base; conductor large and round; tegular apophysis thick and furcate with large and pointed teeth; patellar apophysis angular; retrolateral tibial apophysis extremely large and hollowed (Fig. 1E–H).

Habitat. The species was collected with a sweep net on the foliage of the shrubs in mountainous mixed forest.

Distribution. South Korea (new record), North Korea, Russia, China.

Family Phrurolithidae Banks, 1892
 Genus *Otacilia* Thorell, 1897
 Type species. *Otacilia armatissima* Thorell, 1897.

Otacilia ansula sp. nov.

(Fig. 2)

<http://zoobank.org:act:B4079EA0-3B56-47EF-95DE-3E22AD5956B5>

Material examined. Holotype: Korea: ♂, Jeollanam-do, Haenam-gun, Samsan-myeon, Gurim-ri, Mt. Duryunsan, 34.49 1111N, 126.615000E, alt. 91 m, 15 Oct 2019, S.T. Kim & S.Y. Lee leg.

Etymology. The species name is derived from the Latin noun ‘*ansula*’ meaning hook, referring to the shape of the hook-like retrolateral tibial apophysis in the male palp.

Diagnosis. The males of *O. ansula* sp. nov. and *O. ovoidea* Liu, 2020 have similar palpal organs; however, they can be easily distinguished by the shape of the retrolateral tibial apophysis, distal tegular apophysis, and leg supination. The males of *O. ansula* sp. nov. have slender and hook-shaped retrolateral tibial apophysis (Fig. 2F–H), ovoid distal tegular apophysis, and one dorsal spine on femur with seven pairs of ventral spines on tibia of leg I (Fig. 2D); whereas those of *O. ovoidea* have thick and awl-shaped retrolateral tibial apophysis, club-shaped distal tegular apophysis, and two dorsal spines on femur and eight pairs of ventral spines on tibia of leg I (Liu et al., 2020: 22, f. 13C–F).

Description. Male (Holotype). Total length 2.67. Carapace: 1.38 long/1.18 wide. Eyes: AER 0.35, PER 0.47, ALE 0.09, AME 0.08, PLE 0.10, PME 0.07, ALE–PLE 0.04, AME–ALE 0.01, AME–AME 0.08, AME–PME 0.07, PME–PLE 0.07, PME–PME 0.10. Chelicera: 0.45 long/0.29 wide.

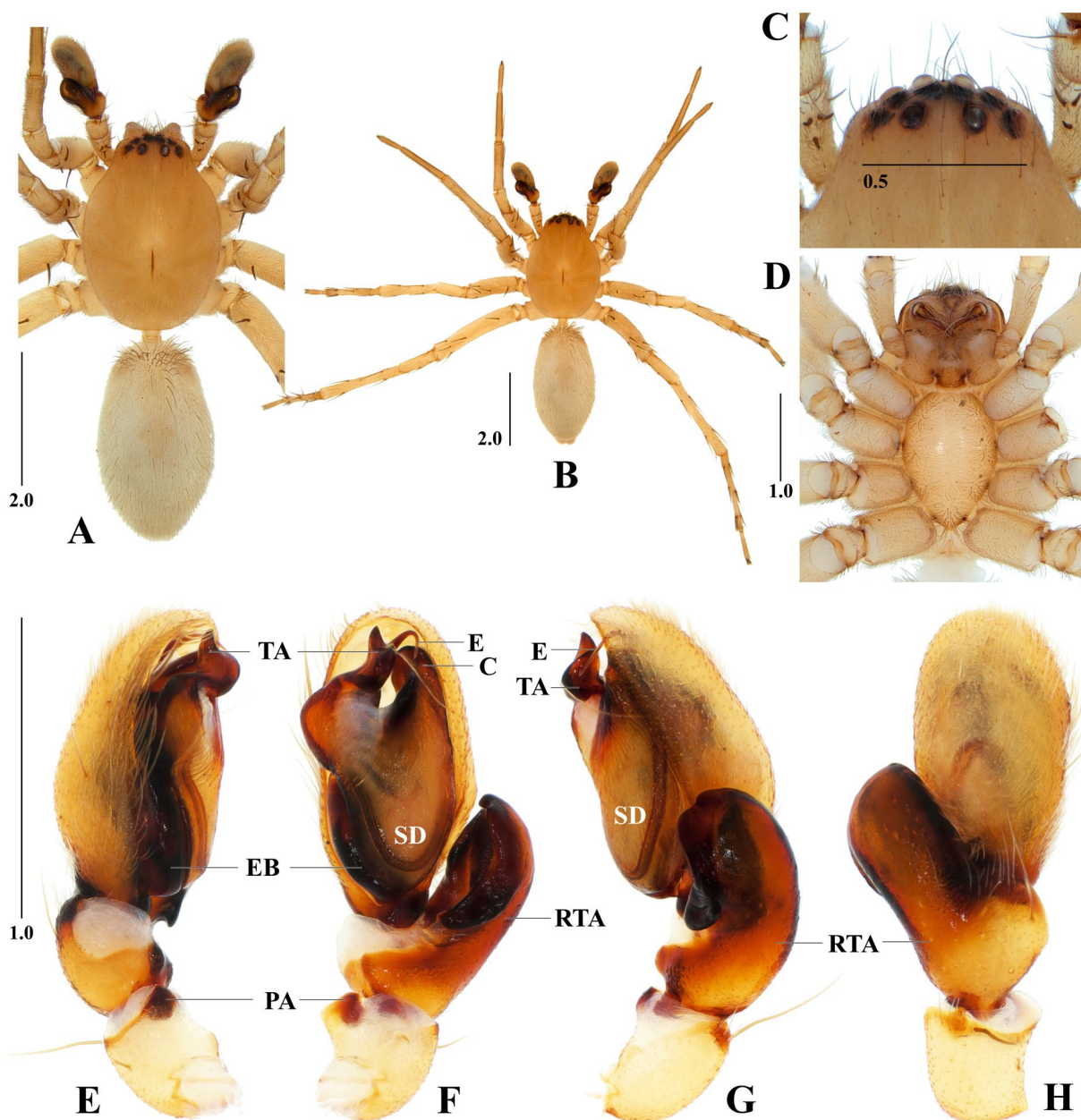


Fig. 1. *Clubiona bakurovi* Mikhailov, 1990, male. A, B, Habitus in dorsal view; C, Eye region; D, Sternum; E, Palp in prolateral view; F, Palp in ventral view; G, Palp in retrolateral view; H, Palp in dorsal view (C, conductor; E, embolus; EB, embolic base; PA, patellar apophysis; RTA, retrolateral tibial apophysis; SD, sperm duct; TA, tegular apophysis). Scale bars in mm.

Endite: 0.36 long/0.26 wide. Labium: 0.15 long/0.22 wide. Sternum: 0.80 long/0.74 wide. Legs: I 5.40 (1.33, 2.10, 1.32, 0.65)/II 4.46 (1.16, 1.59, 1.05, 0.66)/III 3.74 (0.98, 1.19, 1.01, 0.56)/IV 5.99 (1.56, 1.91, 1.68, 0.84). Abdomen: 1.29 long/0.88 wide. Palp: 1.71 (0.45, 0.57, -, 0.69).

Habitus as in Fig. 2A. Carapace ovoid, turbid blackish brown, longer than wide, cervical and radial furrows distinct, longitudinal fovea needle-shaped (Fig. 2A). Eight eyes, all

eyes on the low eye tubercles and encircled with black, both eye rows slightly recurved, posterior eye row longer than anterior eye row (Fig. 2B). Chelicera strongly developed with 2 large promarginal teeth and 5 small retromarginal teeth. Sternum heart-shaped, convex, pale yellowish brown, anterior end truncated, posterior end pointed and deeply protruding between the coxae of leg IV (Fig. 2C). Legs strongly developed, pale yellowish brown, leg spination; femur I-IV

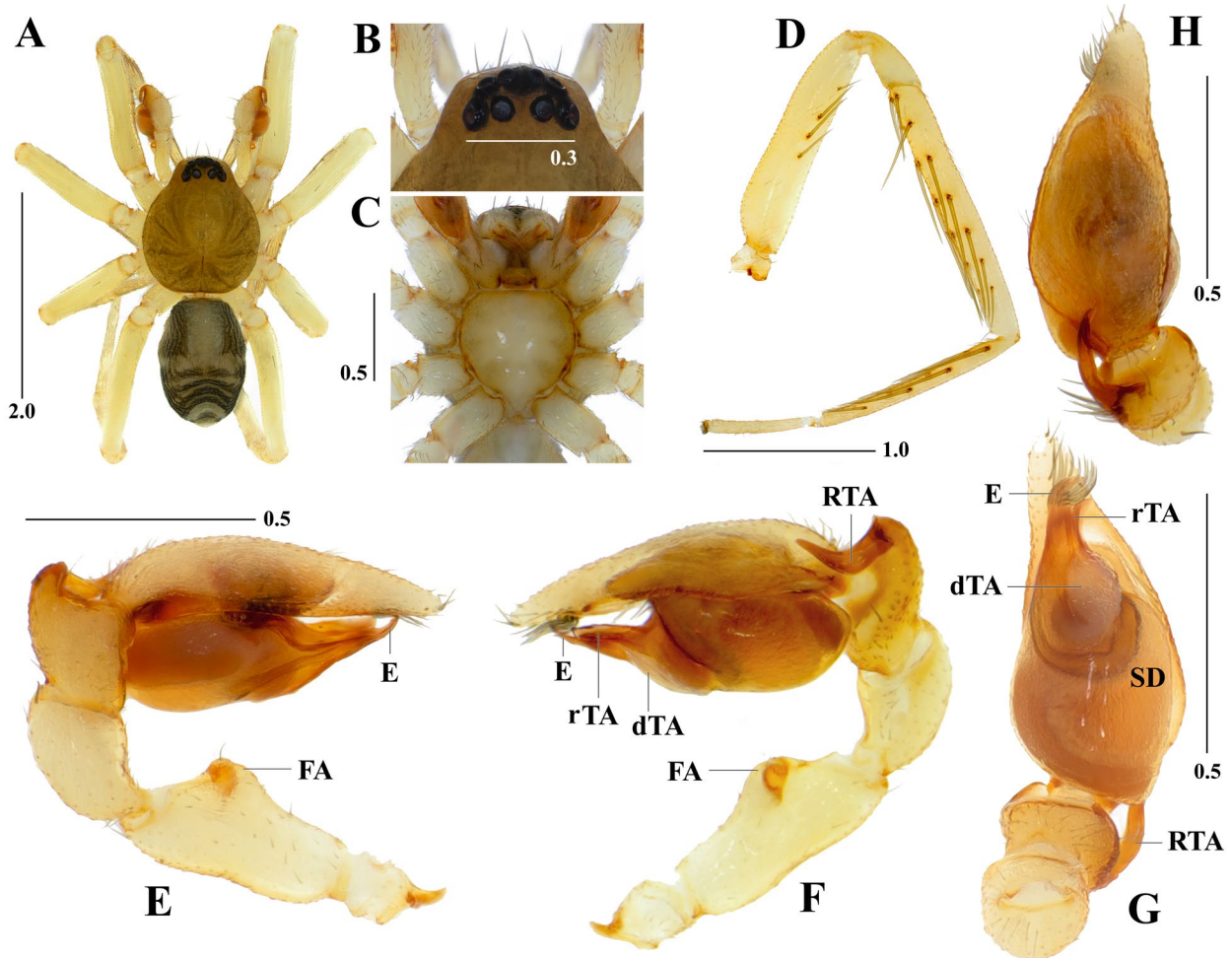


Fig. 2. *Otacilia ansula* sp. nov., holotype male. A, Habitus in dorsal view; B, Eye region; C, Sternum; D, 1st leg (left) in prolateral view; E, Palp in prolateral view; F, Palp in retrolateral view; G, Palp in ventral view; H, Palp in dorsal view (dTA, distal tegular apophysis; E, embolus; FA, femoral apophysis; RTA, retrolateral tibial apophysis; rTA, retrolateral tegular apophysis; SD, sperm duct). Scale bars in mm.

with a one dorsal spine, I (femur 0-0-0-1-1-1-1p/tibia 2-2-2-2-2-2-2v/metatarsus 2-2-2-2v), II (femur 0-0-0-0-0-1-1p/tibia 2-2-2-2-2-2-2v/metatarsus 2-2-2-2v), leg formula IV-I-II-III (Fig. 2A, D). Abdomen ovoid, blackish brown, wrinkled, anteromedian band pale grey and broad, a pair of pale grey markings at middle, 4 thin and thick stripes at posterior part, longer than wide (Fig. 2A). Palp (Fig. 2E–H): femoral apophysis well-developed; patella unmodified; embolus thick and curved with broad base and a pointed tip; retrolateral tibial apophysis large and slender, hook-shaped, strongly bent inward to the base of cymbium; sperm duct U-shaped; retrolateral tegular apophysis long and thin with a pointed tip; distal tegular apophysis membranous and ovoid.

Habitat. The species was collected with pitfall traps in leaf litter on the floor in mountainous mixed forest.

Distribution. South Korea (Jeollanam-do, Mt. Duryunsan).

ORCID

Chang Moon Jang: <https://orcid.org/0000-0003-4343-2279>

Sue Yeon Lee: <https://orcid.org/0000-0002-2066-3747>

Yang Seop Bae: <https://orcid.org/0000-0001-7356-5633>

Seung Tae Kim: <https://orcid.org/0000-0001-5820-9294>

CONFLICTS OF INTEREST

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

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