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Two new records of orb-weaving spiders with a new species (Araneae: Araneidae) from Korea

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Araneidae Clerck, 1757 is one of the largest families within the order Araneae Clerck, 1757, comprising 3,065 species in 177 genera. To date, two species of the genus *Mengora* O. Pickard-Cambridge, 1889 and four species of the genus *Araniella* Chamberlin & Ivie, 1942 have been recorded in Korea. During a seasonal survey of the spider fauna in mountainous terrain conducted from 2018 to 2019, females of *Mangora foliosa* Zhu & Yin, 1998 and a male of *Araniella robusta* sp. nov. were collected with a sweep net between shrubs in mixed forests from Mt. Juwangsan National Park. In this paper, we provide a diagnosis of the new species and descriptions including measurements and morphological illustrations. The new species, *Araniella robusta* sp. nov., can be easily distinguished from other species in the genus *Araniella* Chamberlin & Ivie, 1942 by a branched conductor with two blunt tips and conjugation of the embolus tip and terminal apophysis.

Keywords: Araneidae, *Araniella robusta* sp. nov., Description, *Mangora foliosa*, taxonomy

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Introduction

Araneidae Clerck, 1757 is one of the largest families within the order Araneae Clerck, 1757, comprising 3065 species in 177 genera (World Spider Catalog, 2021). To date, 75 species of araneid spiders in 22 genera have been described from various ecosystems in Korea (Kim, 2019; World Spider Catalog, 2021). Among them, two species of the genus *Mengora* O. Pickard-Cambridge, 1889 and four species of the genus *Araniella* Chamberlin & Ivie, 1942 have been recorded in Korea. In this study, four females of *Mangora foliosa* Zhu & Yin, 1998, known only in China, and a male of *Araniella robusta* sp. nov. were collected with a sweep net between shrubs in mixed forests from Mt. Juwangsan National Park during a seasonal spider survey in mountainous terrain from 2018 to 2019. Herein, we provide a diagnosis of the new species and descriptions including measurements and morphological illustrations.

Materials and Methods

External morphology was examined and illustrated using a stereoscopic dissecting microscope (LEICA, S8APO, Singapore). Images of habitus were taken with a CANON 650D digital camera with a 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). The internal genitalia of *M. foliosa* was prepared with 10% of KOH solution for six hours, and after examination, tissue pieces around it were removed with brushes and needles. Terminology of morphological characters follows Zamani & Marusik (2020) and Zamani *et al*. (2020). Abbreviations used are as follows: ALE = anterior lateral eye, AME = anterior median eye, PLE = posterior lateral eye, PME = posterior median eye, AER = anterior eye row, PER = posterior eye row. The examined specimens of this study were deposited in the collection of the National Institute of Biological Resources (NIBR), Korea.

Taxonomic Accounts

Family Araneidae Clerck, 1757
Genus *Mangora* O. Pickard-Cambridge, 1889

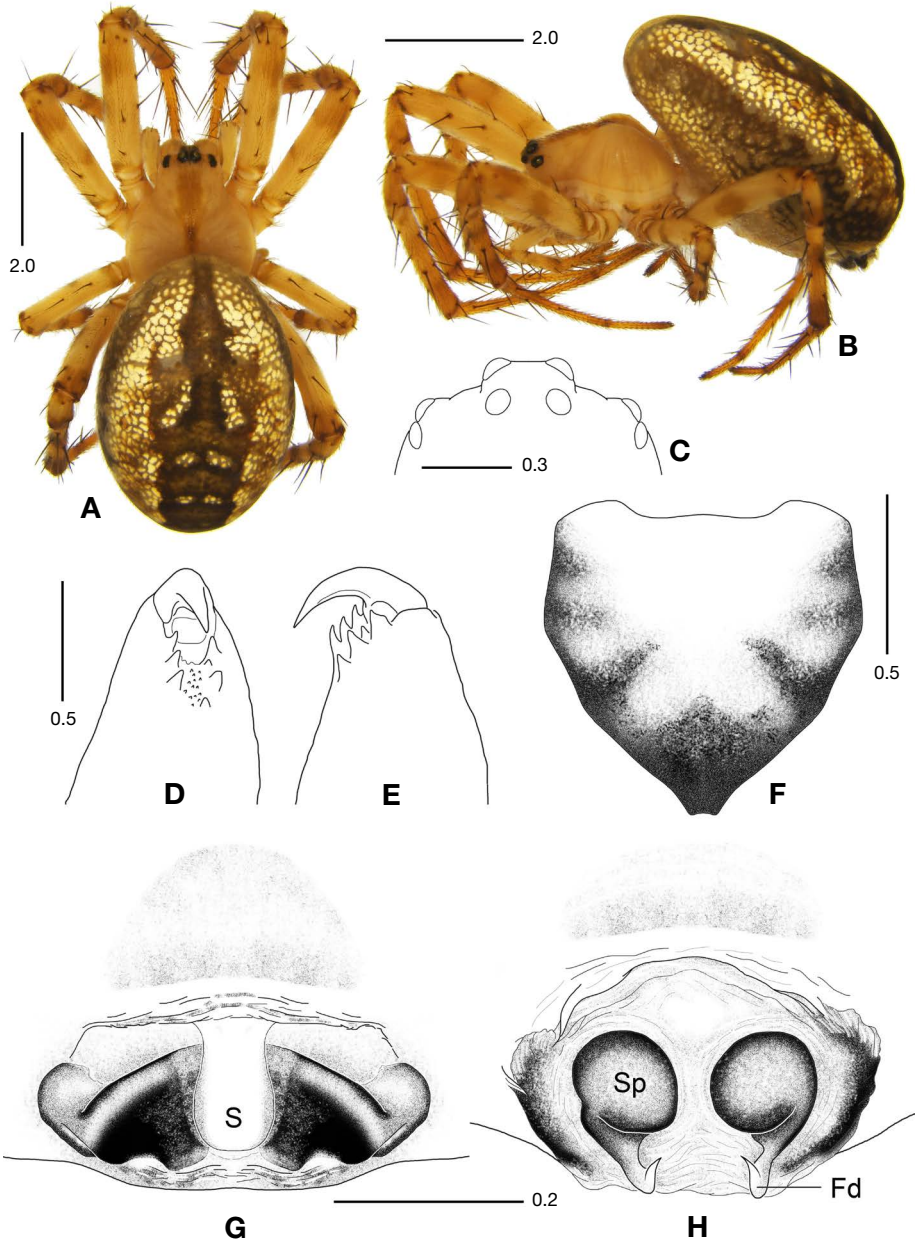

Fig. 1. *Mangora foliosa* Zhu & Yin, 1998, female. A. Habitus in dorsal view; B. Habitus in lateral view; C. Eye area from above; D. Chelicera in ventral view; E. Ditto in retrolateral view; F. Sternum; G. Epigyne in ventral view; H. Internal genitalia in dorsal view (Fd, fertilization duct; S, scape; Sp, spermatheca). Scale bars in mm.

Type species: *Mangora picta* O. Pickard-Cambridge, 1889.

Diagnosis. For detailed diagnosis and description, see Levi (2007).

***Mangora foliosa* Zhu & Yin, 1998 (Fig. 1)**
잎귀털거미 (신칭)
Mangora foliosa Zhu & Yin, in Yin *et al*., 1997: p. 333, f. 236a–e; Song, Zhu & Chen, 1999: p. 293, f. 174A–B; Yin *et al*., 2012: p. 715, f. 356a–e.

Material examined. Three females, 2 June 2019, Mt. Juwangsan National Park, Sangui-ri, Budong-myeon, Cheongsong-gun, Gyeongsangbuk-do (36°23′47.4″N, 129°08′47.3″E, alt. 295 m); one female, 15 July 2018, Mt. Juwangsan National Park, Budong-myeon, Cheongsong-gun, Gyeongsangbuk-do (36°23′42.2″N, 129°09′32.8″E, alt. 348 m), leg. S.T. Kim.

Description. Female. Total length 5.90 (habitus). Cara-

pace: 2.40 long/1.97 wide, dark yellowish brown, pyriform, longer than wide, head region with dark yellowish brown mesal band gently sloped to thoracic region, thoracic region highly elevated, cervical and radial furrows distinct, dark longitudinal fovea deeply depressed (Fig. 1A, B). Eyes: AER 0.76, PER 0.82, all eyes encircled with black, PMEs largest, both lateral eyes contiguous, eight eyes in two rows, AER strongly recurved and PER recurved from above, PER longer than AER (Fig. 1A, C). Chelicera: 0.90 long/0.55 wide, yellowish brown with strongly developed three promarginal teeth and four retromarginal teeth, tiny warty granulations between the margins, fang short and strong (Fig. 1D, E). Endite: 0.44 long/0.34 wide, dusky and pale blackish brown. Labium: 0.20 long/0.40 wide, dusky and pale blackish brown. Sternum: 1.08 long/1.00 wide, yellowish brown, shield-shaped, anterior margin and posterior end depressed, clothed sparsely with short and long blackish-brown hairs, lateral and posterior margins dark (Fig. 1F). Legs: I 9.04 (2.64, 1.05, 2.00, 2.43, 0.92), II 7.55 (2.45, 0.90, 1.30, 2.00, 0.90), III 5.07 (1.54, 0.54, 1.10, 1.18, 0.71), IV 7.56 (2.32, 0.80, 1.70, 1.96, 0.78), pale yellowish brown, stout and strongly developed, all segments with spines except tarsus, femur with pale annuli at the middle and distal end, patella with a dark annulus at the distal end, tibia with dark annuli at the proximal and distal ends, leg formula I–IV≒II–III (Fig. 1A, B). Abdomen: 4.95 long/2.95 wide, ivory, mottled with reticulated patterns, long ovoid, longer than wide, a blackish brown tower-shaped pattern mesially, dark blackish-brown band on both lateral sides, conspicuously protrudent over the carapace (Fig. 1A, B). Palp; 3.24 (0.71, 0.32, 0.51, - , 0.92). Epigyne: simple and sclerotized, pale yellowish white and tongue-shaped scape present, a pair of globular spermathecae separated each other and visible in the internal genitalia, a pair of pointed fertilization ducts located posterodistally (Fig. 1G, H).

Distribution. Korea (new record), China.

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

Genus *Araniella* Chamberlin & Ivie, 1942
Type species: *Epeira displicata* Hentz, 1847.

Diagnosis. For detailed diagnosis and description, see Levi (1974) and Zamani *et al*. (2020).

***Araniella robusta* sp. nov. (Fig. 2)**
굵은발꽃왕거미 (신칭)

Type material. Holotype: male, 2 June 2019, Mt. Juwangsan National Park, Sangui-ri, Budong-myeon, Cheongsong-gun, Gyeongsangbuk-do (36°23′48.4″N, 129°08′55.7″E, alt. 296 m), leg. S.T. Kim.

Etymology. The species name is derived from the Latin adjective '*robusta*' meaning robust referring to the strongly developed legs.

Diagnosis. The new species is most similar to *Araniella cucurbitina* (Clerck, 1757) in the body appearance, but can be easily distinguished from the latter by a branched conductor with two blunt tips, and the tip of embolus and terminal apophysis conjugated (Fig. 2E, F), *versus* undivided conductor with a bent tip, and the tip of embolus and terminal apophysis separated in *A. cucurvitina* (Levi, 1974: 298, figs. 30, 31; Blanke, 1982: 289, fig. 6b).

Description. Holotype male. Total length 4.57 (habitus). Carapace: 2.65 long/2.04 wide, dusky reddish brown, round, longer than wide, thoracic region dark with a pair of dark brownish lateral bands, cervical and radial furrows distinct, dark longitudinal fovea needle shaped and deeply depressed (Fig. 2A). Eyes: ALE 0.13, AME 0.16, PLE 0.12, PME 0.12, ALE–AME 0.28, AME–AME 0.21, PLE–PME 0.39, PME–PME 0.12, ALE–PLE conjugated, AME–PME 0.19, AER 0.91, PER 0.93, all eyes encircled with black, eight eyes in two rows, AER strongly recurved and PER slightly recurved from above, AER slightly shorter than PER (Fig. 2B). Chelicera: 0.85 long/0.32 wide, yellowish brown, strongly developed chelicera teeth with four promarginal teeth and three retromarginal teeth, fang brown (Fig. 2C). Endite: 0.35 long/0.32 wide, yellowish brown. Labium: 0.21 long/0.40 wide, brown. Sternum: 1.12 long/0.90 wide, yellowish brown, both margins brown, inverted triangular, longer than wide, sharply pointed and protrudent between the leg segments (Fig. 2D). Legs: I 7.37 (2.40, 1.00, 1.70, 1.45, 0.82), II 7.18 (2.27, 1.00, 1.45, 1.60, 0.86), III 4.71 (1.60, 0.60, 1.00, 0.97, 0.54), IV 6.81 (2.17, 0.83, 1.50, 1.75, 0.56), reddish brown, stout and strongly developed, all leg segments except tarsus armed with spines, femur II dark brown, distal end of femur III with thick and pale brownish annulus (Fig. 2A), leg formula I-II-IV-III. Abdomen: 2.54 long/2.40 wide, pale grayish brown with a faint folium, ovoid, longer than wide, posterior end wrinkled, 3 pairs of muscle impressions present, posterior part with 4 pairs of black speckles (Fig. 2A). Palp: 1.97 (0.43, 0.29, 0.21, - , 0.48), paracymbium unmodified; tegulum round with a round ridge, tegular tip long with pointed tip, beak-shaped; embolus very long with a broad base and a pointed tip; conductor broad and large, branched with 2 blunt tips; median apophysis hook-shaped with a pointed tip, proturdent outward; terminal apophysis long with a pointed tip, conjugated with an embolic tip (Fig. 2E, F).

Female. Unknown.

Distribution. Korea (Mt. Juwangsan National Park, Gyeongsangbuk-do).

Remarks. The species was collected with a sweep net between shrubs in mixed forests of mountainous terrain near a stream.

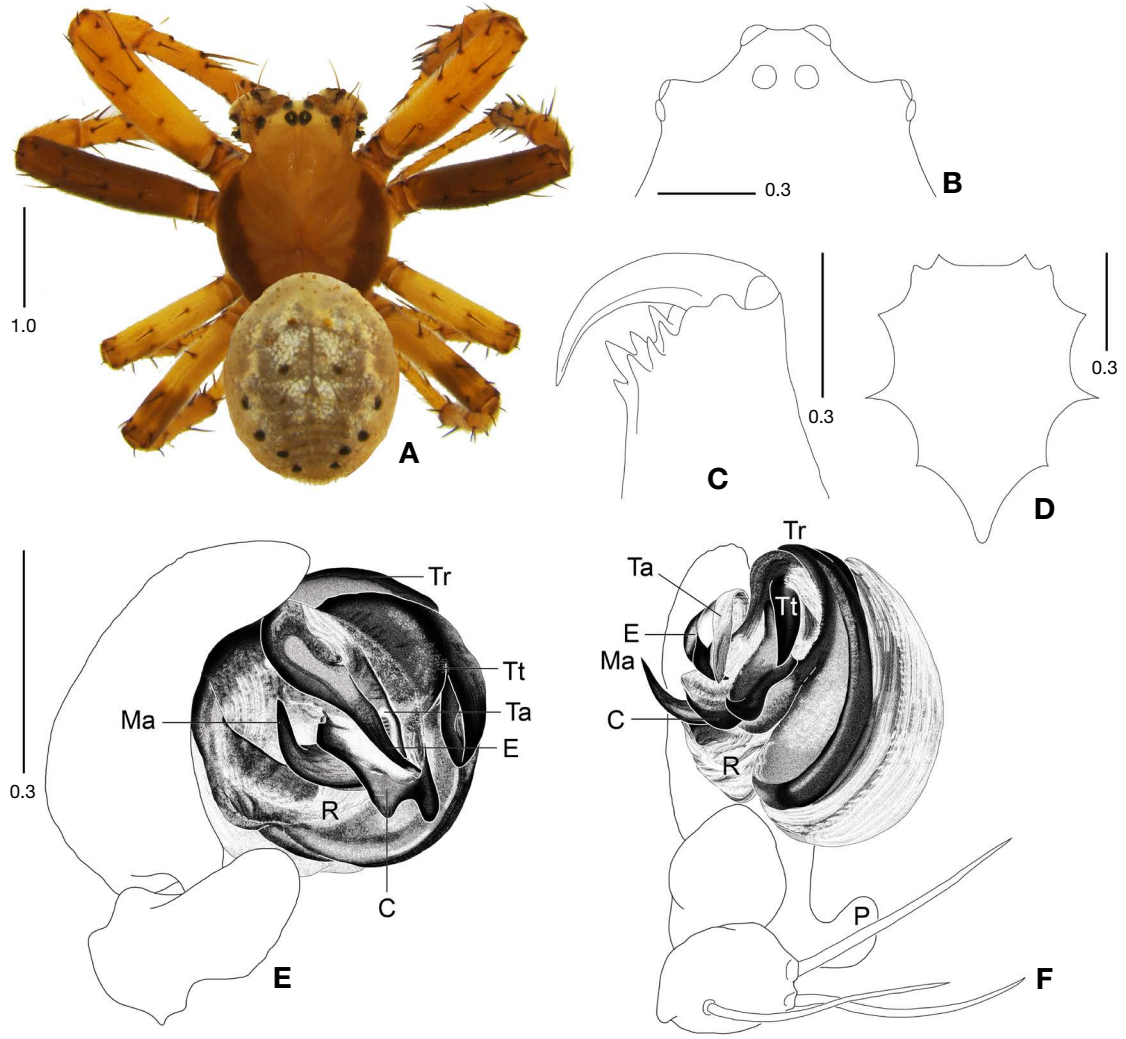

Fig. 2. *Araniella robusta* sp. nov.: holotype male. A. Habitus in dorsal view; B. Eye area from above; C. Chelicera in retrolateral view; D. Sternum; E. Palp in prolateral view; F. Ditto in ventral view (C, conductor; E, embolus; Ma, median apophysis; R, radix; Ta, terminal apophysis; Tr, tegular ridge; Tt, tip of tegulum). Scale bars in mm.

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References

Blanke, R. 1982. Untersuchungen zur Taxonomie der Gattung *Araniella* (Araneae, Araneidae). Zoologica Scripta 11(4): 287-305. https://doi.org/10.1111/j.1463-6409.1982.tb00540.x

Kim, S.T. 2019. Class Arachnida, Order Araneae. In: National Institute of Biological Resources (ed.), National Species List of Korea II, Vertebrates, Invertebrates, Protozoans. National Institute of Biological Resources, Incheon, pp. 412-443.

Levi, H.W. 1974. The orb-weaver genera *Araniella* and *Nuctenea* (Araneae: Araneidae). Bulletin of the Museum of Comparative Zoology 146:291-316.

Levi, H.W. 2007. The orb weaver genus *Mangora* in South America (Araneae, Araneidae). Bulletin of the Museum of Comparative Zoology 159:1-144.

Song, D.X., M.S. Zhu and J. Chen. 1999. The spiders of China. Hebei Science and Technology Publishing House, Shijiazhuang, 640 pp.

World Spider Catalog. 2021. World Spider Catalog. Version 22.0. Natural History Museum Bern, online at http://wsc.nmbe.ch, accessed on 6 May 2021. https://doi.org/10.24436/2

Yin, C.M., J.F. Wang, M.S. Zhu, L.P. Xie, X.J. Peng and Y.H. Bao. 1997. Fauna Sinica: Arachnida: Araneae: Araneidae.

Science Press, Beijing, 460 pp.

Yin, C.M., X.J. Peng, H.M. Yan, Y.H. Bao, X. Xu, G. Tang, Q.S. Zhou and P. Liu. 2012. Fauna Hunan: Araneae in Hunan, China. Hunan Science and Technology Press, Changsha, 1590 pp.

Zamani, A. and Y.M. Marusik. 2020. Two new species of *Araniella* (Aranei: Araneidae) from Western Himalaya, with notes on species reported from India. Arthropoda Selecta 29(3):361-366. https://doi.org/10.15298/arthsel.29.3.09

Zamani, A., Y.M. Marusik and A. Šestáková. 2020. On *Araniella* and *Neoscona* (Araneae, Araneidae) of the Caucasus, Middle East and Central Asia. ZooKeys 906:13-40. https://doi.org/10.3897/zookeys.906.47978

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