Korean Journal of Environmental Biology

Original article

https://doi.org/10.11626/KJEB.2019.37.3.367

Korean J. Environ. Biol.
37(3) : 367-371 (2019)
ISSN 1226-9999 (print)
ISSN 2287-7851 (online)

Two newly recorded Theridiid spiders (Araneae, Theridiidae) from Korea

Sue-Yeon Lee and Seung-Tae Kim[1,*]

Division of Microorganism Resources, National Institute of Biological Resources, Incheon 22689, Republic of Korea
[1]Life and Environment Research Institute, Konkuk University, Seoul 05029, Republic of Korea

***Corresponding author**
Seung Tae Kim
Tel. 02-2049-6163
E-mail. stkim2000@hanmail.net

Received: 18 July 2019
Revised: 4 September 2019
Revision accepted: 5 September 2019

Abstract: Many spiders belonging to *Enoplognatha* Pavesi, 1880 and *Parasteatoda* Archer, 1946 of Theridiidae were collected with sweep net between shrubs and bushes in the mountain forest during a survey of the mountain spider fauna. Among the spiders collected, male *Enoplognatha gramineusa* Zhu, 1998 and female *Parasteatoda ryukyu* (Yoshida 2000) were recognized as newly recorded spiders to Korean spider fauna. The present work describes these two spiders with measurements and morphological illustrations.

Keywords: Description, *Enoplognatha gramineusa*, *Parasteatoda ryukyu*, Theridiidae, Korea

INTRODUCTION

During a survey of the mountain spider fauna, male of *Enoplognatha gramineusa* Zhu, 1998 and female of *Parasteatoda ryukyu* (Yoshida 2000), which are known in China, and Japan and Taiwan, respectively, were collected with sweep net between shrubs and bushes in mountain forest. The genus *Enoplognatha* Pavesi, 1880 is currently 74 species recorded worldwide and 5 species have been recorded in Korea and *Parasteatoda* Archer, 1946 is currently 46 species record worldwide and 7 species have been recorded in Korea. Present work describes male of *Enoplognatha gramineusa* Zhu, 1998 and female of *Parasteatoda ryukyu* (Yoshida 2000) with measurements and morphological illustrations.

MATERIAL AND METHODS

The external morphology was examined using a stereoscopic dissecting microscope (LEICA, S8APO) and illustrated. Photographs of body were taken with a CANON 650D with 60 mm macro-lens. Measurements of each part of the body were taken with an ocular micrometer scale and are recorded in millimeters (mm). Leg and palp measurements are given as leg number, total length (femur, patella + tibia, metatarsus, tarsus). The internal genitalia of female were prepared with 10% of KOH solution for 6 hours, and after examination, tissue pieces around it were removed with brushes and needles. The examined specimens of this study were deposited in the collection of the National Institute of Biological resources (NIBR), Korea.

SYSTEMIC ACCOUNTS

Class Arachnida Lamarck, 1801
Order Araneae Clerck, 1757
Family Theridiidae Sundevall, 1833
Genus *Enoplognatha* Pavesi, 1880

Carapace oval, male elongated, with stridulating ridge posterior on each side in male. Male chelicerae enlarged

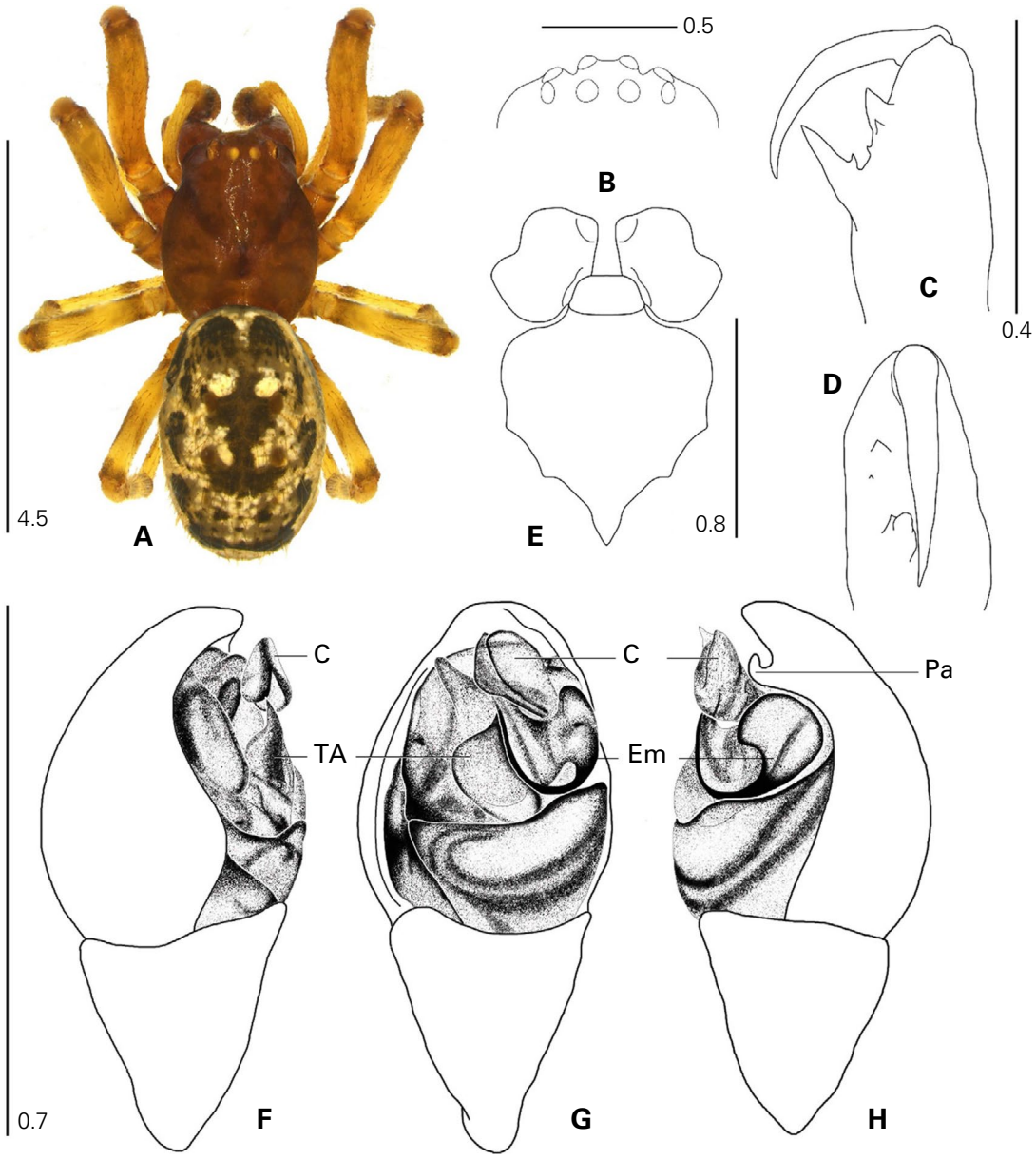

Fig. 1. *Enoplognatha gramineusa* Zhu, 1998. (A) male body (specimen in habitus), dorsal view. (B) eye area from above. (C) chelicera, lateral view. (D) chelicera, ventral view. (E) endite, labium and sternum, ventral view. (F) palp, prolateral view. (G) palp, ventral view. (H) palp, retrolateral view. C = conductor; Em = embolus; Pa = paracymbium; TA = tegular apophysis (scale bars: mm).

with large characteristic apophyses, female chelicerae with several teeth on promargin, one tooth on retromargin. Abdomen suboval and male abdomen with a carina above pedicel. Colulus large with two setae. Usually dark color with a dorsal folium pattern. Female epigynum heavily sclerotized. Male palp with all sclerites, paracymbium on margin of cymbium, a prominent median apophysis supporting embolus, embolus circling clockwise (Yoshida 2001).

***Enoplognatha gramineusa* Zhu, 1998**

출자가랑잎꼬마거미(신칭) (Fig. 1A–H)

Enoplognatha gramineusa Zhu, 1998: 307; Song, Zhu & Chen, 1999: 118.

Enoplognatha intrepida Seo & Sohn, 1998: 77 (male, misidentified).

Material examined. 1 male from Daebaksan, Seokhyeon-dong, Mokpo-si, Jeollanam-do (34°49′35.4″ N, 126°25′ 32.3″E), 06. vi. 2014 (S. T. Kim and S. Y. Lee leg) - coll. NIBR.
Measurements. Total length 3.35 (habitus). Carapace 1.60 long, 1.30 wide. Anterior eye row 0.57, Posterior eye row 0.61. Chelicera 0.90 long, 0.43 wide. Endite 0.42 long, 0.35 wide. Labium 0.30 long, 0.55 wide. Sternum 1.80 long, 1.76 wide. Legs: I, 5.53 (1.51, 2.02, 1.26, 0.74); II, 4.70 (1.34, 1.67, 1.02, 0.67); III, 3.74 (1.08, 1.21, 0.82, 0.64); IV, 5.04 (1.45, 1.75, 1.11, 0.72). Palp 1.49 (0.67, 0.41, −, 0.41). Abdomen 3.50 long, 2.40 wide.
Description. Male: Carapace ovoid, brown, longer than wide (Fig. 1A). Eight eyes arranged in two rows, PER > AER, AER recurved and PER almost straight (Fig. 1B). Cervical and radial furrows dark brown and distinct, longitudinal fovea dark brown, deeply depressed (Fig. 1A). Chelicera brown with two large apophysis on the retromargin, the largest with a small tooth basally one or two warts laterally on inner surface (Fig. 1C, D). Sternum heart-shaped with pointed tip, dark brown, margin blackish brown, protruded between coxae of leg IV, longer than wide (Fig. 1E). Legs long and robust, strongly developed, yellowish brown, legs I and II darker than legs III and IV, each segment with 1−3 annuli, femora of legs I and II mottled, leg formula I-IV-II-III (Fig. 1A). Abdomen elliptical, pale yellowish brown with white spots and black markings forming folium, three pairs of muscle impressions brown, Chinese letter '出-shaped' pattern at center (Fig. 1A). Palpal tibia shorter than cymbium, paracymbium hook-shaped apically, tegular apophysis semi-circled, conductor broad with blunt tip, embolus long and curved with broad base and pointed tip (Fig. 1F−H).
Distribution. Korea (new record), China.
Remarks. This species was collected with sweep net between shrubs and bushes in mountain forest.

Genus *Parasteatoda* Archer, 1946

Carapace oval. Abdomen nearly spherical usually with a small posterior projection, basal color grayish brown to blackish brown and bright orange. Female epyginum with large atrium, two copulatory openings in both side of the atrium, spermathecae nearly spherical. Male palp usually with long embolus, conductor short, median apophysis attached to embolus forming one sclerite, cymbium not extended beyond alveolus, paracymbium hooded (Yoshida 2008).

***Parasteatoda ryukyu* (Yoshida, 2000)**
한라말꼬마거미(신칭) (Fig. 2A−F)

Achaearanea culicivora Chikuni, 1989: 30 (male & female, misidentified per Yoshida, 2016).
Achaearanea ryukyu Yoshida, 2000: 150; Yoshida, 2003: 113.
Achaearanea simulans Namkung, 2001: 84 (female, misidentified); Namkung, 2003: 86 (female, misidentified).
Parasteatoda ryukyu Yoshida, 2008: 39 (Transferred from *Achaearanea*); Yoshida, 2009: 380; Yoshida, 2015: 30; Yoshida, 2016: 16.

Material examined. One female from Donnaeko, Sanghyo-dong, Seogwipo-si, Jeju-do (33°18′05.9″N, 126°35′ 03.8″E), 20. viii. 1993 (S. T. Kim leg) - coll. NIBR.
Measurements. Total length 4.85 (habitus). Carapace 1.35 long, 1.18 wide. Anterior eye row 0.49, Posterior eye row 0.52. Chelicera 0.45 long, 0.25 wide. Endite 0.45 long, 0.17 wide. Labium 0.15 long, 0.30 wide. Sternum 0.80 long, 0.72 wide. Legs: I, 8.17 (2.40, 2.40, 2.55, 0.82); II, 4.99 (1.50, 1.38, 1.30, 0.81); III, 3.47 (1.13, 0.95, 0.90, 0.49); IV, 6.57 (1.90, 2.70, 1.32, 0.65). Palp 1.17 (0.45, 0.20, −, 0.52). Abdomen 3.30 long, 3.05 wide. Epigyne 0.95 long, 1.15 wide.
Description. Female: Carapace ovoid, brown, longer than wide (Fig. 2A). Eight eyes arranged in two rows, PER > AER, AER recurved and PER almost straight (Fig. 2C). Cervical and radial furrows distinct, longitudinal fovea slightly depressed. Clypeus concave. Sternum inverted triangle-shaped with dark blunt tip, yellowish brown and mottled, longer than wide (Fig. 2D). Legs long and stout, strongly developed, yellowish brown, tibiae with annuli, coxae, trochanters and patellae of legs I and II darker (Fig. 2A). Abdomen globular, yellowish brown with white spots and brown flecks, two pairs of brown dorsal spots and posterior marking, brown spots to spinnerets laterally, longer than wide (Fig. 2A, B). Epigyne with elliptical atrium, one pair of spermathecae visible like a rabbit ear externally (Fig. 2E) and globular in internal genitalia (Fig. 2F).
Distribution. Korea (new record), Japan, Ryukyu Is., Taiwan.
Remarks. This species was collected with sweep net between shrubs and bushes in mountain forest. The male of *A. simulans* also described and illustrated by Namkung (2001: p. 84, f. 13.2c; 2003: p. 86, f. 13.2c) with retrolateral view of male palp is also doubt whether it is correct. The palpal structure is considerably different with that of many other

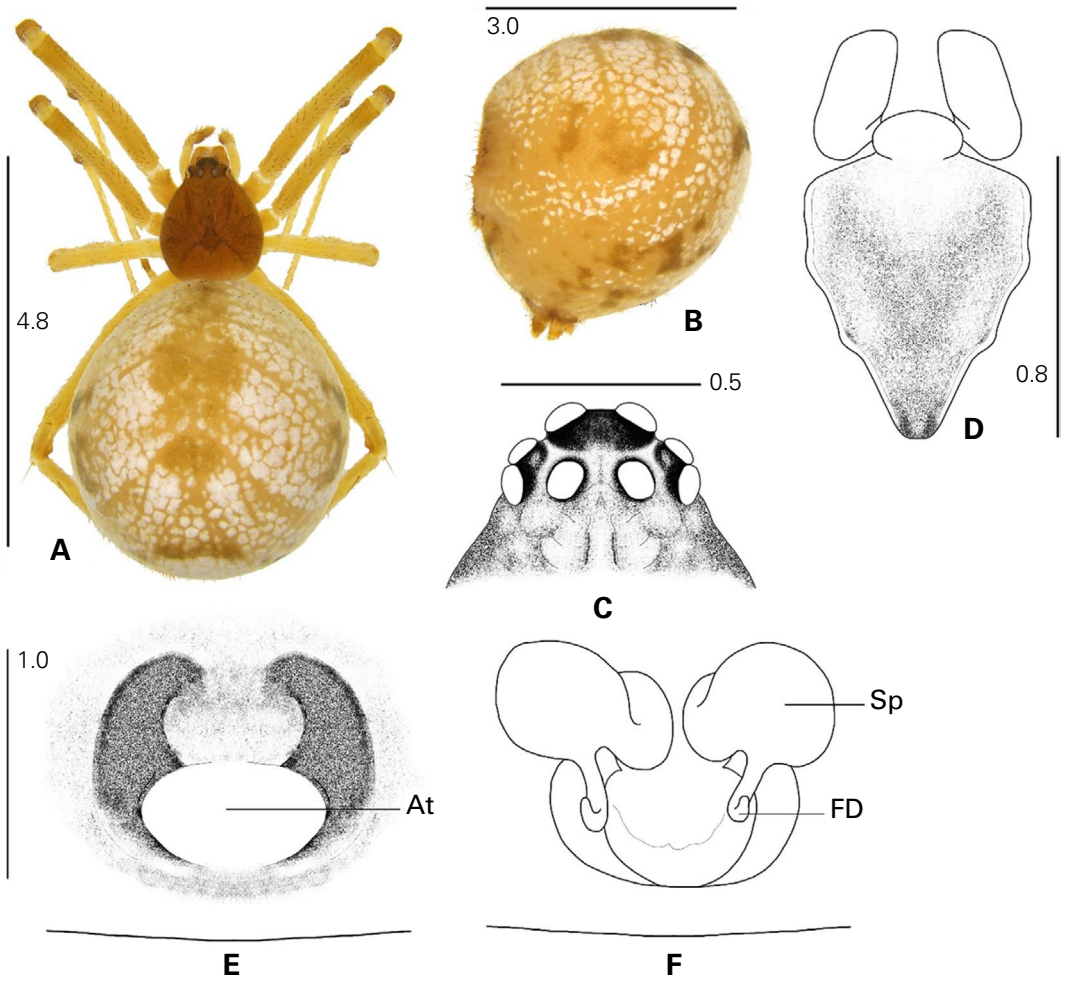

Fig. 2. *Parasteatoda ryukyu* (Yoshida, 2000). (A) female body (specimen in habitus), dorsal view. (B) female abdomen (specimen in habitus), lateral view. (C) eye area from above. (D) endite, labium and sternum, ventral view. (E) epigyne, ventral view. (F) internal genitalia, dorsal view. At = atrium; FD = fertilization duct; Sp = spermatheca (scale bars: mm).

authors on this species. And it is hard to identify what species it is by that illustration alone. Therefore, distribution of *A. simulans* in Korea is very unclear in current state, and therefore this species needs to be removed from Korean spider fauna until there is a more scientific report on this species in the future.

ACKNOWLEDGEMENTS

The study was supported by a grant from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) of the Republic of Korea (NIBR201902204).

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