

**A NEW SPECIES OF *Enoplognatha* PAVESI, 1880
(ARANEAE: THERIDIIDAE: EPISININAE) FROM
ZHEJIANG PROVINCE, CHINA**

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ABSTRACT

A new comb-footed spider species, *Enoplognatha fuyangensis* Barrion & He, n.sp., is described and illustrated. It belongs to subfamily Episininae under family Theridiidae and was collected from the rice stubbles in Zhejiang Province, China. It represents the 17th species of *Enoplognatha* from China.

Key words: Comb-footed spider, *Enoplognatha fuyangensis* n.sp., Episininae, riceland spider, taxonomy, Theridiidae

INTRODUCTION

The genus *Enoplognatha* was established by Pavesi in 1880 with *Theridion mandibulare* Lucas, 1846 as type-species by original designation from North Africa. Six genera, namely, *Drepanodus* Menge, 1869; *Phyllonethis* Thorell, 1869; *Sympagia* Simon, 1894; *Garritus* Chamberlin & Ivie, 1933; *Marmatha* Chamberlin & Ivie, 1942; and *Rugatha* Chamberlin & Ivie, 1942 are all synonyms of *Enoplognatha* (Yoshida, 2003).

To date, 17 species of *Enoplognatha* have been reported from China (Table 1). With *Enoplognatha japonica* Boesenberg & Strand, 1906 synonymized with *E. caricis* (Fickert, 1876) by Yoshida (2003), only 16 species are, therefore, hitherto treated as valid.

In this paper, we describe and illustrate *Enoplognatha fuyangensis* Barrion & He, n.sp., a new species of comb-footed spider belonging to the subfamily Episininae (Archer, 1950; Yoshida, 2003) and Group 4 (Levi and Levi, 1962) in the family Theridiidae.

Table 1. Nominal species of *Enoplognatha* reported from China up to 2012.

<i>Enoplognatha</i> Species	Remarks
<i>E. angkora</i> Barrion, Barrion-Dupo & Heong, 2012	
<i>E. bobaiensis</i> Zhu, 1998	
<i>E. caricis</i> (Fickert, 1876)	Transferred from <i>Steatoda</i> by Simon (1884)
<i>E. daweiensis</i> Yin & Yan, 2012	
<i>E. diodonta</i> Zhu & Zhang, 1992	
<i>E. goulouensis</i> Yin & Yan, 2012	
<i>E. gramineusa</i> Zhu, 1998	
<i>E. hangzhouensis</i> Zhu, 1998	
<i>E. japonica</i> Boesenberg & Strand, 1906	Synonymized with <i>E. caricis</i> by Yoshida (2003)
<i>E. lordosa</i> Zhu & Song, 1992	
<i>E. mangshan</i> Yin, 2012	
<i>E. margarita</i> Yaginuma, 1964	
<i>E. mordax</i> (Thorell, 1875)	Transferred from <i>Zilla</i> by Simon (1884)
<i>E. oelandica</i> (Thorell, 1875)	Transferred from <i>Steatoda</i> by Simon (1884)
<i>E. qiu</i> Zhu & Zhang, 1992	
<i>E. submargarita</i> Yaginuma & Zhu, 1992	
<i>E. yizhangensis</i> Yin, 2012	

MATERIALS AND METHODS

The materials used in this study were provided by second author to the senior author during the latter's visit to China in the last quarter of 2015.

All spider examinations were done using a Leica M 165 stereomicroscope with top illumination. The drawings of selected body parts including the male pedipalp followed the grid system technique. Female copulatory organ was dissected and cleared in 100% pure clove oil (NOW Foods, Tao of Herbs, Bloomingdale, IL 60108, USA) for 24 to 48 hrs. The cleared copulatory organ was mounted on glass slide and photos were taken using the Revenge VHX digital microscope. Specimens used in the illustrations and photography were preserved in 70% ethanol with corresponding handwritten data labels (Koh and Ming, 2014).

All measurements and numbers on scale bars are in millimeters (mm) except the scale bar in the epigynum taken under Revenge VHX digital microscope using Lens Z100: X300. Morphological abbreviations/acronyms: AER = length of anterior eye row; PER = length of posterior eye row; ALE = Anterior lateral eye; AME = Anterior median eyes; PME = Posterior median eyes; PLE = Posterior lateral eyes; AME-AME = distance

between anterior median eyes; AME-ALE = distance between anterior median eyes and anterior lateral; PME-PME = distance between posterior median; PME-PLE = distance between posterior median eyes and posterior lateral eyes; L = length; W = width and H = height; ti = palpal tibia; cy = cymbium. Leg formula 1423 means leg 1 the longest followed by leg 4, then leg 2, and leg 3 the shortest. All types are deposited in the State Key Laboratory of Rice Biology, China National Rice Research Institute, Hangzhou, China.

TAXONOMY

Enoplognatha fuyangensis Barrion & He, n. sp.

Figures 1A-H and 2

Description: Holotype: male. Total body length 4.10. Carapace L 2.10, W 1.70, H 1.25. Abdomen L 2.40, W 1.60, H 1.40.

Carapace. Yellow brown with three parallel light brown longitudinal lines directed toward grayish fovea, light grayish brown carapace margins and black eye margins. Carapace 1.23 times longer than wide. Eye region about 0.69 times cephalic width. Chelicerae yellowish brown, L 1.40, W 0.45 and projected vertically. Promargin of chelicera bearing relatively large sharply pointed tooth with large base. Retromargin with two large teeth, the apical prominently more robust than basal and both encircled by gray circular to oblong ring. Fang short, brownish yellow with outer half curved inwards and tip strongly pointed. Maxillae 2.25 times longer than wide, yellow except white apicomeresad area and black serrula, apices moderately converging and outer lateral margins slightly concave at midlength. Labium yellow brown and two times wider than long. Sternum yellow and lined with long brown hairs, 1.33 times longer than wide (1.20:0.90), posterior end grayish brown and bluntly rounded at tip.

Eyes. Anterior eye row (AER) recurved, slightly shorter than procurved posterior eye row (PER) (0.73:0.79). Eye diameter: AME = ALE = PME = PLE (0.13). Eye separation: PLE-PLE (0.14) > PME-PME (0.11) > ALE-ALE (0.10) > AME-AME (0.08). Median ocular quad slightly wider behind (0.38) than in front (0.36). Clypeus light brown, lip-like, and 1.17 times AME diameter.

Legs. Uniformly yellow, clothed with brown hairs and setae. Femur III, tibia II and metatarsus II subequal in length. Femur IV as long as metatarsus I. Leg formula 1423. Pedipalp slightly longer than femur IV. Retrolateral side of tibia with two trichobothria, one on apical third and the other on basal third. Posteroventral end of femur with long seta about 2.3 times longer than femoral diameter. Leg measurements: Please see Table 2.

Abdomen. Dorsum yellow with chalk white spots, anterodorsal end slightly narrow and pointed overhanging dark yellow concave and sclerotized anteroventral area. Dorsomedian area bears a pair of dark brown rounded sigilla with a yellow T-band at middle. Posterior end broadly rounded to subtruncate with black transverse band. Venter gray brown on posterior of epigastric furrow. Anterior third with yellow brown sclerotized shield-like plate marked with an inverted V-band at center. Spinnerets yellow brown all located posteroventrally at abdominal end but not visible dorsally.

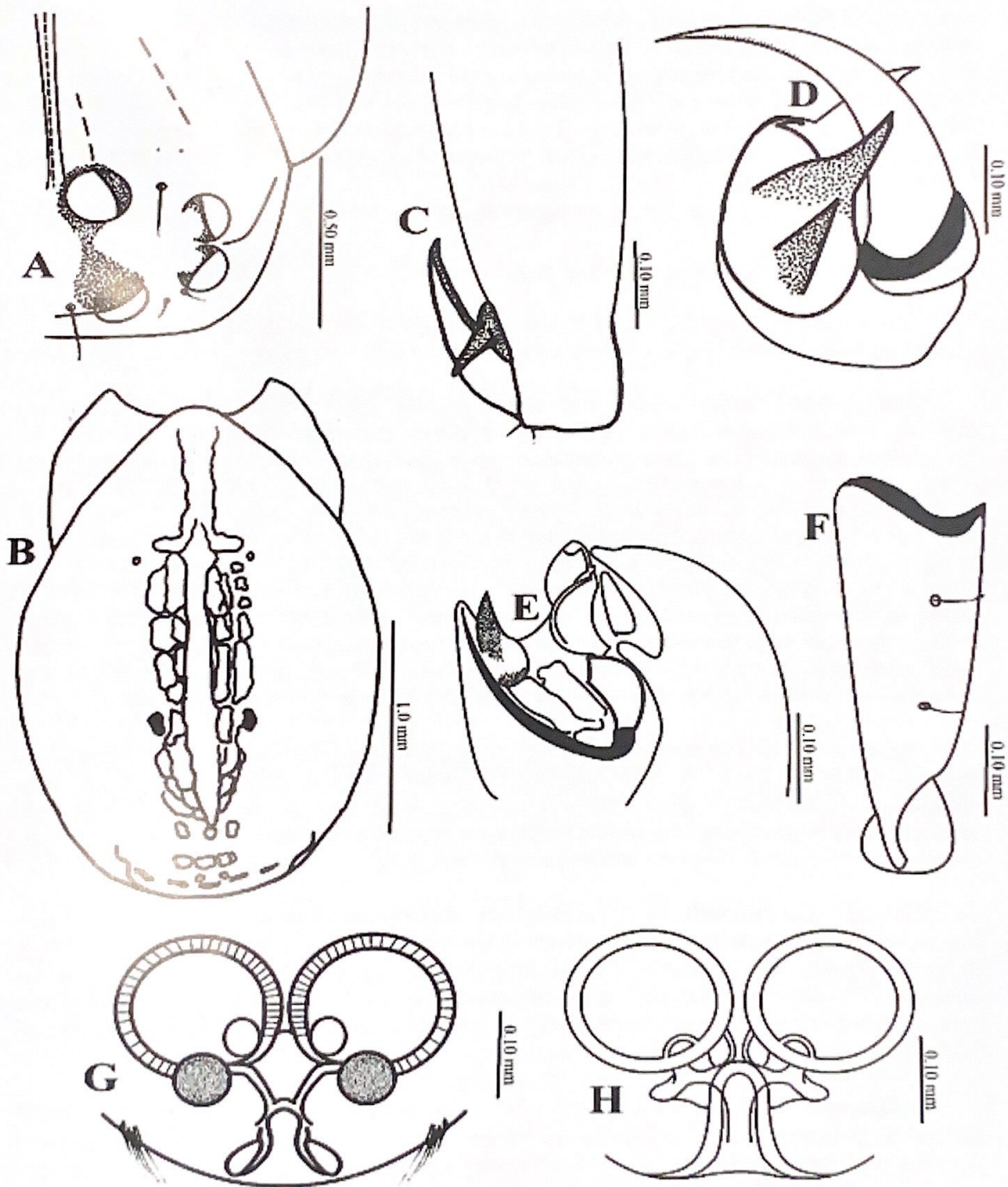


Figure 1. *Enoplognatha fuyangensis* Barrion & He, **n. sp.**: (A) left eye area, (B) dorsum of abdomen, (C) left chelicerae, (D) retromarginal teeth, (E) part of cymbium showing embolus, (F) tibia of pedipalp, (G, H) cleared epigynum, ventral and dorsal views.



Figure 2. Uncleared epigynum of *Enoplognatha fuyangensis* Barrion & He, **n.sp.**, showing globose tip of spermathecae.

Table 2. Leg measurements of holotype male of *E. fuyangensis* Barrion & He, **n. sp.**

Leg	I	II	III	IV	Pedipalp
Femur	2.55	2.10	1.70	2.30	0.89
Patella	0.85	0.75	0.60	0.85	0.42
Tibia	2.40	1.70	1.10	1.90	0.33
Metatarsus	2.30	1.70	1.20	1.80	-
Tarsus	1.00	0.90	0.80	0.95	0.66
Total	9.10	7.15	5.40	7.80	2.33

Palpal organ. Embolus short and rotate clockwise at 3 o'clock position with its tip pointing to half past 10 o'clock position, base subtriangular and innermost basal edge truncate. Cymbial notch located at apicolateral 0.19 length of cymbium. Terminal apophysis strongly triangular apically. Longest cymbial hairs as long as palpal tibia, and about 1.3 times longer than width of cymbium. Conductor with a robust lobe-like base.

Female: Total length 4.80. Carapace L 2.20, W 1.70, H 1.40. Abdomen L 2.90, W 2.00, H 1.90.

Carapace. Yellow except black eye margins, yellow brown clypeus, and gray median longitudinal band becoming darker in foveal area. Carapace highest along posterior cephalic right in front of fovea, 1.29 times longer than wide. Eye region about 0.8 times cephalic width. Chelicerae vertical as in male, yellowish gray with three promarginal and one retromarginal teeth. Basal promarginal tooth quite large and two apical teeth very minute. Maxillae and labium both yellow brown, size and shape similar to those of male. Apicomesad area of maxillae with whitish yellow subtriangular patch. Sternum hirsute, yellowish gray with a yellow median band, posterior end black and extended farther posteriorly between coxae IV.

Eyes. Anterior eye row (AER) recurved and slightly shorter than procurved posterior eye row (PER). Eye diameter: PLE (0.13) > AME =ALE=PME (0.11). Eye separation: PME-PLE (0.13) > AME-AME =AME-ALE = PME-PME (0.11). Clypeus H 0.15, 1.40 times AME diameter.

Legs. All legs uniformly yellow with relatively thick brown hairs and setae, and dark brown claws. Tibia I as long as femur II. Metatarsi I to III longer than tibia I to III, but metatarsus IV shorter than tibia IV. Leg formula 1423. Pedipalp claw single tooth with 8-10 teeth. Measurements: Please see Table 3.

Abdomen. Oblongate with chalk-white markings dorsally and a pair of broad yellow brown bands along anterior half. Broad bands narrowing toward posteromedian half, forming a U-band. Dorsal median with pair of globose, brownish black sigilla. Venter brownish yellow except blackish brown epigynal area. Spinnerets color and shape similar to those of male.

Table 3. Leg measurements of paratype female of *E. fuyangensis* Barrion & He, **n. sp.**

Leg	I	II	III	IV	Pedipalp
Femur	2.20	1.80	1.40	2.00	0.80
Patella	0.85	0.70	0.60	0.80	0.31
Tibia	1.80	1.30	0.90	1.60	0.53
Metatarsus	1.90	1.45	1.10	1.55	-
Tarsus	0.85	0.65	0.70	0.90	0.76
Total	7.60	5.90	4.70	6.85	2.40

Epigyne. Spermathecae globose, each about 0.17 in diameter, almost touching each other along inner lateral margins. Scape-like process bell-shaped, 1.40 times wider than high.

Material examined. Holotype: male (Coll. No. Fy01), CHINA, Zhejiang, Fujian Province, Fu Yang irrigated ricefield, 26 June 2015, He Jiachun. **Paratype:** female (Coll. No. FY02), same data as holotype.

Remarks/Diagnosis: *E. fuyangensis*, **n.sp.**, is morphologically closest to *E. caricis* (Fickert, 1876), but differs in at least seven characters as enumerated in Table 4, the most obvious of which is the distinctly mottled white brown abdominal dorsum without U-band, the shape and closeness to each other of the spermathecae in the female paratype and the smaller ratio of palpal tibia and cymbium ($ti/cy = 0.50$) and cheliceral spine pattern in the male (holotype).

Etymology: The species is named after the type locality, Fu Yang, in Zhejiang, Fujian Province, China.

Table 4. Comparative table that differentiates morphologically *E. fuyangensis* Barrion & He, **n. sp.** from its closest ally, *E. caricis* (Fickert).

Characters	<i>Enoplognatha caricis</i> (Fickert)	<i>Enoplognatha fuyangensis</i> Barrion & He, n.sp.
1. Dorsal abdominal markings	U-band with irregular to serrated brown bands distinct along submargins	Mottled white brown median band present; u-band absent
2. Spermathecae	Oblongate and wide apart	Globose and almost touching each other
3. Scape-like posterior border of epigynum	Broadly hat-like, 1.57 times wider than high	Bell-shaped, 1.40 times wider than high
4. Cymbial spur	Inner margin of spur almost horizontal; spur located on apical 0.20 of cymbium length	Inner margin of spur in oblique position; spur located on apical 0.17 of cymbium length
5. Trichobothrium[-a] on tarsus of pedipalp	Absent in Zhu (1998) and Yoshida (2003)	Two trichobothria, each located subapically and subposteriorly
6. Ratio of length of palpal tibia and cymbium [ti/cy]	1.11	0.50
7. Body length	Male 4.00-7.30 mm Female 4.00- 6.20 mm	Male 4.10 mm Female 4.80 mm

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