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A NEW SPECIES OF SLENDER CRAB-SPIDER OF THE GENUS *TIBELLUS* SIMON, 1875 (ARANEAE : PHILODROMIDAE) FROM BANGLADESH

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Abstract

The paper contains a taxonomic description (added: including diagnosis and illustration) of a new species of slender crab-spider of the genus *Tibellus* Simon, 1875 from Bagerhat, Bangladesh. The species *T. bagerhatensis* n.sp. was identified as new to science. Generic diagnosis and distributions are also provided together with the description of the new species.

Key words: Taxonomy, Slender crab-spider, *Tibellus bagerhatensis*, Araneae, Philodromidae, Bangladesh.

Introduction

The spiders of the family Philodromidae F. O. Pickard-Cambridge, 1871 are commonly known as 'Slender crab- spiders'. They are usually found on the grasslands and on the shrubs of small gardens. Earlier these spiders belonged to the subfamily Philodrominae under the family Thomisidae Sundevall. Homann (1975), on the basis of some important morphological and molecular-genetic characters, separated subfamily Philodrominae from the family Thomisidae and established 'the Philodromidae' as a full family. At present, the family Philodromidae is composed of 29 genera and 527 valid species worldwide (World Spider Catalog, 2024).

The members of the genus *Tibellus* Simon, 1875 are commonly known as 'long-bodied grassland crab-spiders'. These are small to medium in size with long, slender body and legs. The spiders under this genus are widely distributed and till date the genus contains a total of 53 valid species occurring in the world fauna (World Spider Catalog, 2024). The genus *Tibellus* was first erected by Simon in 1875 with Holarctic species *Aranea oblonga* Walckenaer, 1802 as type-species. The records of the study on these spiders in Bangladesh are scarce except Okuma *et al.* (1993), Biswas (2009 , 2019) and Biswas and Raychaudhuri (2003), but a good number of species are recorded and described in other countries of the world, like – India (Tikader, 1960, '62, '71, '80; Gajbe & Gajbe, 1999),

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China (Song & Zhu, 1997; Zhao, 1993; Song *et al*., 1999), Korea (Kim & Jung, 2002; Kim & Seong, 2015; Jang *et al.*, 2023), Japan (Yaginuma, 1986; Ono, 1988), the Philippines (Barrion & Litsinger, 1995), USSR (Mikhailov, 1997; Efimik, 1999; Danilov, 1991; Utotschkin 1981, '84), Israel (Levy, 1977), France (Millot, 1942; Walckenaer, 1802), USA (Gertsch, 1933; Platnick, 1997), Africa (Van den Berg & Dippenaar-Schoeman, 1994; Dippenaar-Schoeman, 2022) etc. The present paper contains description of a new species *Tibellus bagerhatensis* n. sp. together with the generic diagnosis and distribution.

Materials and Methods

Collection and Preservation: The specimens of the new species were collected from the garden of south-western coastal village Betaga, district Bagerhat, Bangladesh. The collection was made by jarking the branches of shrubs to an inverted umbrella placed underneath the plants. The two specimens (one male and one female) thus collected, were then transferred to a large glass jar containing a wad of cotton soaked with chloroform for anesthetizing specimens. These were then carried to the laboratory and placed in a petri dish with 70% ethyl alcohol for sorting and cleaning. The specimens were then placed separately in glass vials containing 70% ethyl alcohol for identification and study. After identification, the specimens were preserved (single specimen in single vial) permanently in Audmans' Preservatives following Lincoln and Sheal (1985).

Identification and Study: The specimens thus preserved were identified by the study of different important taxonomic characters, viz. body shape, size, colour, dorsal decoration, eye patterns, segmentation and spination of legs, cheliceral structure and dentition, characters of maxillae, labium, sternum, spinnerets, male pedipalps, female epigynum etc. All these were done following the keys and taxonomic descriptions made by Gertsch (1933), Tikader (1960, '62, '80 ,'87), Ono (1988),Kaston (1972),Barrion and Litsinger (1995), Dondale and Redner (1978), Levy (1977), Van der Berg and Dippenaar-Schoeman (1994), Song and Zhu (1997), Zhao (1993), Yaginuma (1986) and Biswas (2009). The specimens were identified up to the genus *Tibellus* which was confirmed from the Arachnida section, Zoological Survey of India, Kolkata.

For the identification up to species level, taxonomically important body-parts of the specimens were dissected out under a Stereozoom Binocular Microscope placed on a petri dish filled with 70% ethyl alcohol and sand grains. Male palps after dissection were boiled in 10% KOH solution for 3-5 minutes for relaxation and extension of different parts. Female epigynum after dissection, placed in clove oil for 12 to 18 hours for

clearing of its different parts (Levi, 1965; Tikader, 1987). After that, both the male palp and female genitalia (epigynum) were placed in separate microvials and put in a large vial along with the parent spider within Audmans' Preservatives.

Illustrations: The whole body of the spider and its different body-parts were illustrated under the Stereozoom Binocular Microscope (Mention model) fitted with Camera Lucida and other necessary accessories. Leg measurements were taken under the same condition in the following sequences : femur, patella, tibia, metatarsus, tarsus and total length. All the measurements were taken in millimeters (mm).

The morphological and anatomical characteristics of the collected specimens were compared with other species of *Tibellus*, but there was no match for any of the species under the genus *Tibellus*. It was, therefore, thought that the collected specimens mightbelong to new species under the genus *Tibellus*. Later on, I consulted with the experts on spiders in India and Bangladesh, and after meticulous observation on the collected specimens, they were also of the opinion that the said specimens belonged to a new species under the genus *Tibellus.*

The naming of the new species was done following the rules of the International Commission on Zoological Nomenclature (ICZN). The new spider species has been named "*bagerhatensis*" based on the type-locality of Bagerhat. It was mentioned in `Etymology' and the procedure of establishing it as a new species is described in detail in the remarks.

Type deposition: After completion of necessary drawings and measurements of different body-parts, the types (Holotypay and Allotype) of specimens were put separately with the collections of the Department of Zoology, Khulna Government Women's College, Khulna and later on, these specimens will be deposited to the Museum of the Department of Zoology, University of Dhaka, in due course of time.

Results and Discussion

Taxonomy

Family: PHILODROMIDAE F. O. Pickard-Cambridge, 1871
Genus: ***Tibellus***Simon, 1875
Type-species: *Aranea oblonga* Walckenaer, 1802

1875. *Tibellus* Simon, *Les Arachnides de France*, **2**: 307.
1895. *Tibellus*: Simon, *Hist. Nat. Araign.*, **1**(4) : 1065.

1933. *Tibellus*: Gertsch, *American Mus. Novit*., **593**: 2.
1940. *Tibellus*: Comstock, *The Spider Book, New York* : 562.
1941. *Tibellus:* Millot, *Acad. Sc. De Inst. France*, Mem. **65**: 72.
1951. *Tibellus*: Locket and Millidge, *British Spiders*, **1**: 202.
1960. *Tibellus*: Tikader, *J. Bombay nat. Hist. Soc.*, **57**(1): 176.
1977. *Tibellus*: Levy, *Israel J. Zool.*, **26**: 226.
1978. *Tibellus:* Dondale & Redner, *Insects & Arachnids of Canada*, **5**: 96.
1980. *Tibellus:* Tikader, *Fauna of India, Araneae,Thomisidae*, **1**(1): 213.
1994. *Tibellus*: Van den Berg & Dippenaar-Schoeman, *Koedoe*, **37**(1): 67.
1997. *Tibellus:* Platnick, *Advances in Spider Taxonomy* : 820.
1997. *Tibellus:* Song & Zhu, *Fauna Sinica, Araneae, Philodromidae*, : 209.
1999. *Tibellus*: Efimik, *Arthropoda Selecta*, **8**(2) : 103.
1999. *Tibellus*: Gajbe & Gajbe, *Rec. zool. Surv. India*, **97** (3): 191.
2002. *Tibellus:* Kim & Jung, *Korean Arachnol.*, **17**(2): 208.
2003. *Tibellus:* Biswas & Raychaudhuri, *J. Bombay nat. Hist. Soc.*,**100**(1) : 84.
2015. *Tibellus:* Kim & Seong, *Korean Arachnol.*, **31**(1): 11.
2023. *Tibellus:* Jang *et al*., *Anim. Syst. Evol. Divers*, **39**(4): 272.
2024. *Tibellus: World Spider Catalog*, Version 25.0, online at – http ://www. wsc.nmbe.ch. (accessed on 7th October, 2024).

Diagnosis: The spiders of the genus *Tibellus* Simon, 1875 are usually small. The body is distinctly elongated, flattened and slender. A long mid-dorsal brown stripe present from the anterior of the carapace up to the end of abdomen. Total body length ranges from 5.70 mm to 11.00 mm. Carapace longer than wide, yellow-brown, rather low smoothly convex at lateral margins, approximately 2.80 mm long and 2.35 mm wide; with a distinct brown median longitudinal stripe and sometimes with a pair of lateral stripes present. Eyes small, black, approximately uniform in size and grouped close anteriorly; posterior row of eyes strongly recurved; posterior median eyes (PME) distinctly closer to each other than to posterior lateral eyes (PLE). Legs long, slender, laterigrade, yellow, without any band and well-developed scopulae and claw-tufts; leg IV longer than the I and II. *Abdomen* elongate, slender, yellow with light brown mid-dorsal longitudinal stripe or band and sometimes with one or two pairs of dark spots. Pappal tibia of male with or without small retrolateral apophysis and usually with small simple ventral apophysis. Embolus short, spur-like, situated at distal end of tegulum. Epigynum of female with median septum that varies species to species. Spermathecae ovoid or kidney-shaped.

Biological Note: Representatives of genus *Tibellus* are usually found extending the elongate and slender body on the tall grasslands or ferns and similar herbs in the fields and small shrubs in the gardens. It becomes difficult to detect them sometimes because the striped body is pressed close to the stem and legs are extended/ stretched anterior and posteriorly. They cannot move quickly and consume prey in a shorter distance.

Members of *Tibellus* cannot spin any web and also cannot jump like other spiders but move slowly over grasslands and foliage of small plants in the gardens. They are good predators of smaller insects in the crop-fields and gardens. In the crop-fields, maximum numbers of these spiders are found in the grasses of boundaries.

Distribution : ASIA, EUROPE, AMERICA and AFRICA .

Description of new species:

***Tibellus bagerhatensis* n. sp.**

(Figs. 1a-1i)

Material examined: **Holotype**: 1 male, Bagerhat, 12. V. 2012, Coll. V. Biswas; **Allotype**: 1 female, Bagerhat, 12. V. 2012 & 18. VII. 2014, Coll. V. Biswas; Paratype: Nil.

Designation of type: The male spider on which the present description and illustrations have been made is herein designated as Holotype and the other female spider specimen is designated as Allotype.

Holotype: This is a single male specimen preserved permanently in Audmans' preservatives. It was collected from a deep garden of village Betaga, district Bagerhat (Type locality) and later an illustrated description was made on the basis of its important taxonomic characters.

Allotype: This is a single female specimen collected from the same locality and from the same spot (shrub). Its epigynum (female genitalia) is drawn to show the female identifying character of the new species.

General: Both male and female spiders collected are morphologically similar except body measurements and sex organs. The body is small, soft, nearly brown in colour. Cephalothorax and legs light brown; abdomen brownish with deep brown, long striae. Total body length of male (holotype) 3.90 mm, Carapace 1.65 mm long, 1.00 mm wide, 0.85 mm height; abdomen 2.25 mm long, 0.70 mm wide and 0.30 mm height. Total body

length of female (allotype) 4.20 mm. Carapace 1.72 mm long, 1.20 mm wide, 0.92 mm height; abdomen 2.42 mm long, 0.95 mm wide and 0.42 mm height.

Cephalothorax: Broad, nearly oval, anteriorly narrowing with straight marginally and posteriorly broad, medially wide. Eyes white, heterogeneous, each encircled with black basal band; lateral eyes largest, both median eyes are small; anterior row nearly straight and the posterior row strongly procurved; ocular quad narrowing anteriorly (Fig. 1a). Chelicerae brown, strong, margined with chitinous ridge (Fig. 1b). Maxillae brown, elongate, anteriorly broad and scopulate (Fig. 1c). Labium brown, medially wide, basally flat and anteriorly scopulate (Fig. 1c). Sternum light brown, long, anteriorly wide, margin concave and posteriorly pointed (Fig. 1d). Legs long and slender, not so strong, with sharp spines and setae; leg formula 1423 and measurements (in mm) are shown in Table 1.

Table 1. Measurements (in mm) of different leg segments of *Tibellus bagerhatensis* n. sp.

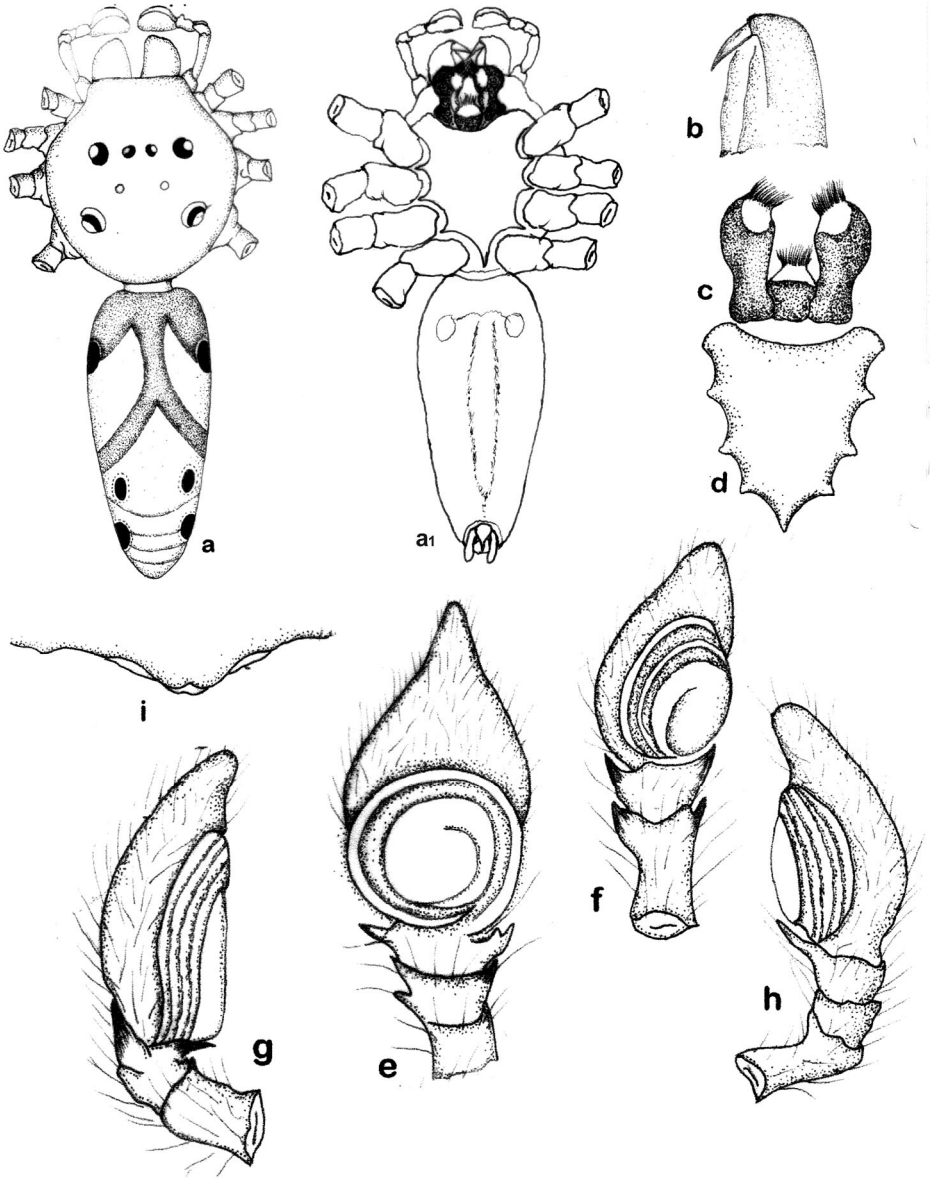
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.25/2.25	0.65/0.65	2.10/2.10	1.60/1.60	1.10/1.10	7.70/7.70
II	1.40/1.40	0.30/0.30	1.20/1.20	1.00/1.00	0.60/0.60	4.50/4.50
III	1.50/1.50	0.40/0.40	1.10/1.10	1.00/1.00	0.50/0.50	3.70/3.70
IV	1.50/1.50	0.40/0.40	1.30/1.30	1.20/1.20	0.40/0.40	4.50/4.50
Palps	0.40/0.40	0.20/0.20	0.30/0.30	-	0.65/0.65	1.55/1.55

Males are a little smaller than females but same in colour and appearance. Male palps with sharp cymbium and apophysis, tegulum coiled (Fig. 1e-1g).

Abdomen: Broad, elongate, nearly dumbbell-shaped, anteriorly wide ; dorsum decorated with long striae and three pairs of black spots or sigillae (Fig. 1a). The abdomen of male is also the same as the colour and decoration of a female. Epigynum blunt, lip-like (Fig. 1h).

Etymolog: The species is named according to the name of the type-locality from where the specimen was collected.

Distribution: Bangladesh : Gardens of village Betaga, district Bagerhat (type-locality).



Figures 1 (a-i): *Tibellus bagerhatensis* n. sp.

a. Whole body (dorsal view); a1. Whole body (ventral view); b. Chelicerae; c. Maxillae & Labium; d. Sternum; e. Male palp (ventral view); f. Male palp (retrolateral view); g-h. Male palp (lateral view, left & right); i. Female epigynum

Remarks: Species *Tibellus bagerhatensis* n. sp. appears close to *T. shikerpurensis* Biswas & Raychaudhuri (2003) in appearance but may easily be separated out by the following characters –

1. Cephalothorax broad, medially wider and nearly rounded.
2. Maxillae, labium and sternum structurally different.
3. Abdominal dorsum with 3 pairs of sigillae and much different decoration and
4. Typical chelicerae, epigynum and pedipalps.

Also, none of the already described *Tibellus* species (Tikader, 1960, ’62; Gertsch, 1933; Levy, 1977; Biswas, 2009; Biswas & Raychaudhuri, 2003; Efimik, 1999; Jang *et al.*, 2023; Van der Berg & Dippenaar-Schoeman, 1994) resemble with the present one.

The species, is therefore, described as new to science.

Discussion

The new species *Tibellus bagerhatensis* n. sp. is a small, elongate and unique slender crab-spider found in the grassland and shrubs of gardens of Bangladesh. It shows some special diagnostic characters on the basis of those it is established as a new species. Due to these important characteristics, we may expect that there are some considerable numbers of endemic species present in different areas of the country.

From this record, it is also found that till date, only 2 (two) species have been recorded and described on this genus (including the present one). Therefore, a detailed taxonomic study on this genus may be undertaken to know the total species composition of the genus *Tibellus* in Bangladesh.

Moreover, we also know that the slender crab-spiders are distributed both in the garden and different crop-fields. So, it is assumed that these spiders may have a good predatory role in controlling the pest insects of both these ecosystems (like other crab-spiders).

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