



TAXONOMIC ACCOUNT OF SOME CRAB-SPIDERS GENUS *THOMISUS* WALCKENAER, 1805 (ARANEAE: MISUMENINAE: THOMISIDAE) FROM BANGLADESH

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ABSTRACT

A taxonomic study on the crab-spiders genus *Thomisus* Walckenaer was carried out in different areas of coastal region of Khulna, Bangladesh. Two species were recorded in this study of which *T. bhagabati* n. sp. was identified as new to science and another one *T. cherapunjius* Tikader was recorded for the first time in Bangladesh. The generic diagnosis, description of the species, distribution and key to the species was provided.

Keywords: Taxonomy, morphology, crab-spider, Araneae, Misumeninae, Thomisidae.

Introduction

Crab-spiders (Family Thomisidae) of the genus *Thomisus* Walckenaer, 1805 are one of the common predatory members in the gardens and forests of Bangladesh. They are very colourful and attractive but cannot make any web and stay themselves spreading the first pair of legs on the leaves or flowers of plants for the preys. Some members show a degree of camouflage or mimicry during preying in the fields. The genus was first established by Walckenaer in 1805 with the type-species *T. onustus* Walckenaer. At present, the genus is represented by 145 species in the world fauna (World Spider Catalog 2023) and 45 species in the Indian Sub-continent (Tikader 1971, 1980, Majumder 2005, Majumder 2007, Keswani 2012) but their numbers are very poor in Bangladesh and till date, only 8 (eight) species are recorded (Chowdhury and Nagari 1981; Chowdhury and Pal 1984, Okuma *et al.* 1993, Biswas *et al.* 1993, Biswas 2009, Biswas 2019, Biswas 2023a, b). A good number of species are described in other Asian countries like - China (Chen and Zhang 1991, Zhao 1993) Japan (Song *et al.* 1999, Song and Zhu 1997, Shikai and Takano 1984, Yaginuma 1986, Ono 1988, Ono *et al.* 2009), Korea (Paik 1978, Kim and Lee 2012, Singapore Koh 1989, Koh *et al.* 2015) and in Philippines (Barrion and Litsinger 1995).

In Bangladesh, there is no taxonomic description of *Thomisus* species except Biswas (2023 a, b). Therefore, the present study was undertaken and it represents an illustrated description of 2 (two) species of the genus *Thomisus* Walckenaer of which one is described as new to science and another one is newly recorded from the areas of present study. Generic diagnosis, distribution and key to the species are also provided herewith.

Materials and Methods

Collection and Preservation: Specimens of the genus *Thomisus* Walckenaer were collected from the gardens and crop-fields of southern coastal districts Bagerhat, Khulna and Pirojpur of Bangladesh. Collection was made by jerking the branches of plants on the inverted umbrella placed underneath the plants (Tikader 1987). Specimens thus collected were then placed to a large glass jar filled with chloroform for paralyzing the specimens and make it easy for next step of study. These are then transferred to a petri-dish filled with 70% ethyl alcohol for sorting. After sorting, specimens were preserved in separate glass vials with 70% alcohol and put for identification and future study.

Identification and Study: The specimens thus preserved were identified following different books and journals of home and abroad. These are - Tikader (1971, 1980, 1987); Tikader and Biswas (1981), Ono (1988, 2009), Barrion

and Litsinger (1995), Song and Zhu (1997), Dondale and Redner (1978), Okuma *et al.* (1993), Koh (1989), Chen and Zhang (1991), Zhao (1993), Levy (1973, 1985), Yaginuma (1886), Kim and Gwon (2002), Biswas (2009), Tang and Li (2010) and Kim and Lee (2012).

After identification, the specimens were permanently preserved for future study (separate specimens in separate vials) in Audmans' Preservatives (90 parts 70% alcohol + 5 parts glycerene + 5 parts glacial acetic acid) following the method by Lincoln and Sheals (1985).

Necessary taxonomically important body-parts of identified specimens were dissected out under the Stereozoom Binocular Microscope placed on a petri-dish filled with 70% ethyl alcohol and sand grains. Male palp after dissection was boiled in 10% KOH for 3-5 minutes and female epigynum after dissection placed in clove oil for 12 to 18 hours (Levi 1965; Tikader 1987). After dissection, both male palp and female genitalia (epigynum) were placed in separate microvials and put it in a large vial along with the parent spider within Audmans' Preservative.

Illustrations and Photographs: Whole body of spider and its different body-parts were illustrated under a Stereozoom Binocular Microscope fitted with Camera lucida. Leg measurements were taken under the same condition in the following sequences: femur, patella, tibia, metatarsus, tarsus and total length. All measurements were taken in millimeters (mm). Photographs of the identified specimens were taken both in natural condition (in the field) by DSLR Camera fitted with 90 mm macrozoom lens and in the laboratory by the Camera fitted microscope (model SV8, Zeiss).

Type deposition: After completion of necessary drawings of different body-parts, with Camera lucida, the preserved specimens were put separately (single specimen in single vial) and then placed in a large glass jar full of 70% alcohol. Later, the types were preserved with the collection of the Department of Zoology, Khulna Government Womens' College, Khulna and will be deposited to the Museum of the Department of Zoology, University of Dhaka, in due course of time.

Results and Discussion

Systematics

Family: THOMISIDAE Sundevall, 1833

Subfamily: Misumeninae Sundevall, 1833

Genus: *Thomisus* Walckenaer, 1805

Type-species: *T. onustus* Walckenaer, 1805

1805. *Thomisus* : Walckenaer, *Tabl. Aran.*,: 28.

1869. *Thomisus* : Stoliczka, *J. Asiat. Bengal.*, 38: 225.

1895. *Thomisus* : Simon, *Hist. Nat. Aranees*, 1(4): 1023.

1935. *Thomisus* : Dyal, *Bull. Dept. Zool. Panjab Univ.*,1: 200.

1954. *Thomisus* : Roewer, *Catalogue der Araneae*, 2: 855.

1957. *Thomisus* : Commelini, *Rev. Zool. Bot. Afr.*, LV (1-2): 1.

1962. *Thomisus* : Tikader, *J. Linn. Soc.*, London, 44 (300): 569.

1971. *Thomisus* : Tikader, *Mem. Zool. Surv. India*, 15 (3): 13.

1973. *Thomisus* : Levy, *Israel J. Zool.*, 22: 124.

1980. *Thomisus* : Tikader, *Fauna of India*, Araneae: Thomisidae, 1(1): 30.

1985. *Thomisus* : Levy, *Fauna Palaestina, Arachnida II, Araneae, Thomisidae*: 35.

1986. *Thomisus* : Yaginuma, *Spiders of Japan in colour*: 211.

1988. *Thomisus* : Ono, *Bull. Natn. Sci. Mus.*, Tokyo: 193.

1991. *Thomisus* : Chen and Zhang, *Fauna of Zhejiang, Araneida*: 278.

1995. *Thomisus* : Barrion and Litsinger, *Riceland spiders of South and Southeast Asia*: 228.

1997. *Thomisus* : Song and Zhu, *Fauna Sinica, Thomisidae and Philodromidae*: 163.

1997. *Thomisus* : Mikhailov, *Cat. Spiders of territories of former Soviet Union*: 197.

1997. *Thomisus* : Platnick, *Advances in Spider Taxonomy*: 839.

1999. *Thomisus* : Song *et al.*, *The Spiders of China*: 486.

2001. *Thomisus* : Kim and Gwon, *Korean Arachnol.*, 17 (1): 45.

2002. *Thomisus* : Buchar and Ruzicka, *Catalogue Spiders of Czech Republic*: 172.

2004. *Thomisus* : Gajbe, *Rec. Zool. Surv. India, Occ. Pap.* **227**: 112.
2005. *Thomisus* : Majumder, *Mem. Zool. Surv. India*, **20** (3): 51.
2006. *Thomisus* : Platnick, *World Spider Catalog*, Version 6.5: 2688.
2007. *Thomisus* : Dippenaar-Schoeman and Hrtten, *Fauna of Arabia*, **23**: 171.
2009. *Thomisus* : Biswas, *Encyclopedia of Flora and Fauna of Bangladesh*, Arachnida, **18** (1): 355.
2010. *Thomisus* : Tang and Li, *Zootaxa, Monograph*, **2369**: 62.
2012. *Thomisus* : Kim and Lee, *Invertebrate fauna of Korea*, **21** (9): 45.
2015. *Thomisus* : Platnick, *World Spiders Catalog*, Version 15.0, <http://www.research.amnh.org/iz/spider/catalog/intro.html>
2023. *Thomisus* : *World Spider Catalog*, Version 23.0, Natural History Museum, Bern., online at – <http://www.wsc.nmbe.ch> (accessed on 7th Febr. 2023)

Diagnosis: Spiders of the genus *Thomisus* Walckenaer with short, compact and robust bodies. Body bright in colour. Cephalothorax truncated in front, with the upper fore corners strongly and conically protruberant and divergent. All eyes very small, arranged in two rows, with lateral eyes on distinct eye tubercles; anterior row strongly recurved with medians nearer to laterals than the others. Leg long, relatively much longer in males; leg I and II much longer than III and IV.

Abdomen narrow and truncated in front, enlarging to a considerable width behind, where at either corner with a short, blunt, conical protruberance.

Females small to medium in size (2 mm – 11 mm). Carapace usually as wide as long, high and convex but posterior margin concave. Males are much smaller (1.9 mm – 3.6 mm) and most species darker in colour, with strong erect setae both on the carapace and abdomen. Eye tubercles in all species distinct and sharply pointed.

Biological Note: Spiders of the genus *Thomisus* are usually live in vegetation, mainly inside flower corollas. They cannot make any web and can consume small insects in the crop-fields and gardens. Some can change their colours to match the substratum (Levy 1985). They catch their prey

lurking on the flowers with their legs spread widely.

Distribution: Africa, America, Asia, Australia and Europe.

Key to the species of genus *Thomisus*

1. Abdomen elongately oval, posteriorly narrowed, without any reticulation; cephalothorax with distinct radii; palpal cymbium elongate, inwardly curved and bluntly pointed; cheliceral margins without any teeth; labium anteriorly narrowed; sternum anteriorly broad and posteriorly narrowed
..... *T. bhagabati* n. sp.
- Abdomen rhomboid, posteriorly broad, with scally reticulation; cephalothorax without any radii but with alternately arranged yellow, black and white longitudinal bands; palpal cymbium short and sharply pointed ; only outer margin of chelicerae with one tooth; labium anteriorly broadly rounded ; sternum parallel sided, posteriorly pointed *T. cherapunjius*

1. *Thomisus bhagabatii* n. sp. (Figure 1a-e; 3a)

Material examined: male, Chitalmari, Bagerhat, Bangladesh, 18. V. 1993, Coll. V. Biswas (Holotype); male, Batiaghata, Khulna, Bangladesh, 25. VII. 1992, Coll. V. Biswas (Paratype).

General: Body small, light brown in colour. Cephalothorax and legs brown; abdomen yellowish.

Male (Holotype): Total body length 8.30 mm. Carapace 2.50 mm long, 2.00 mm wide; abdomen 5.80 mm long, 1.80 mm wide and 1.20 mm height.

Female (Allotype): Unknown.

Cephalothorax: Male: broad, longer than wide, anteriorly convex and narrowing, posteromedially wide. Both anterior and posterior eyes recurved; anterior row of eyes shorter; posteromedian eyes distantly placed than the anteromedians; ocular quad wider than long; radii distinct. Chelicerae brown, moderately strong, wider basally, without any teeth on the margins, clothed with hairs and spines (Fig. 1b). Maxillae longer than wide, anteriorly wide and scopulate (Fig. 1c). Labium longer than wide, posteriorly wide, anteriorly narrow and scopulate (Fig.

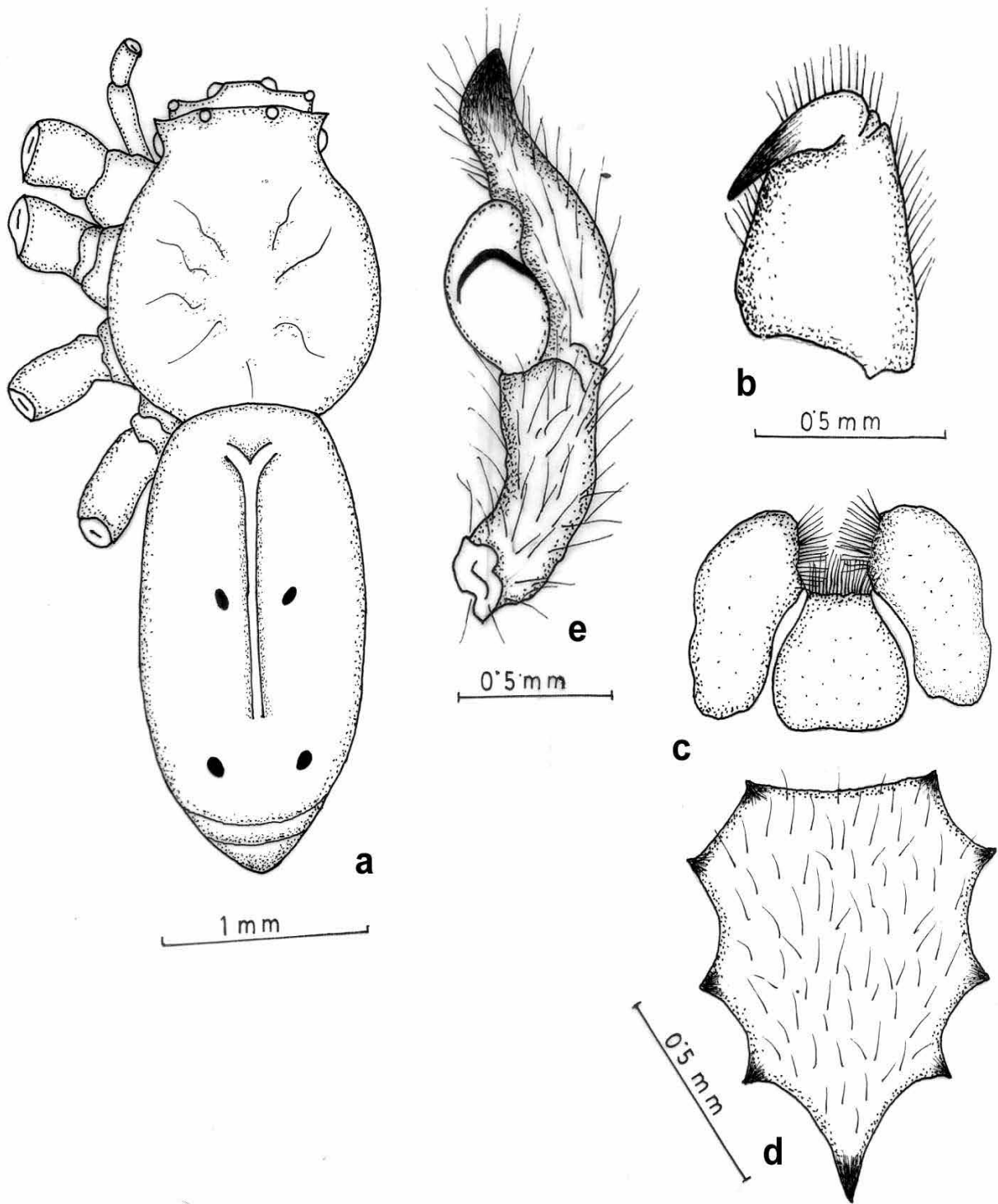


Figure 1. *Thomisus bhagabatii* n. sp. a. Whole body (dorsal view); b. Chelicerae; c. Maxillae and Labium; d. Sternum; e. Male palp

Table 1. Measurements (mm) of leg segments of *T. bhagabati* in. sp.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	4.00/4.00	1.50/1.50	2.40/2.40	2.50/2.50	1.00/1.00	11.40/11.40
II	3.90/3.90	1.00/1.00	2.10/2.10	2.10/2.10	1.00/1.00	10.10/10.10
III	2.00/2.00	0.90/0.90	1.80/1.80	1.80/1.80	0.70/0.70	7.20/7.20
IV	2.00/2.00	0.90/0.90	1.80/1.80	1.80/1.80	0.70/0.70	7.20/7.20

1c). Sternum heart-shaped, anteriorly wide, posteriorly produced and pointed, clothed with spines (Fig. 1d). Legs long and strong, clothed with spines; leg formula 1243 and the measurements (in mm) are shown in Table 1.

Abdomen: longer than wide, nearly dumbel shaped; dorsum with a median anteriorly bifurcated band; posterior half with 2 pairs of dark brown spots or sigillae.

Type-specimen: **Holotype-** male in spirit; **Paratype-** one male in spirit.

Type-locality: Bangladesh: districts Bagerhat and Khulna, southwestern part of the country near Sunderbans.

Etymology: The species is named after Professor Bhagabati Sarker, Department of Philosophy, Government Profulla Chandra College, Bagerhat, Bangladesh.

Type-locality: Bagerhat and Khulna of Bangladesh.

Remarks: By the shape of the abdomen the species *T. bhagabatii* n. sp. appears close to *T. elogatus* Stoliczka (Tikader, 1980) but it stands distinct in having cephalothorax wider than abdomen, band on ocular area straight, abdomen with an anteriorly bifurcate mid-longitudinal band, posteriorly with 2 pairs of dark brown spots or sigillae and typical male palp.

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

Type deposition: The types are at present in the collection of the Department of Zoology, Khulna Government Womens' College, Khulna and will be deposited to the Museum of the Department of Zoology, University of Dhaka, Bangladesh, in due course of time.

2. *Thomisus cherapunjius* Tikader (Figs. 2a- f; Fig. 3b)

1966. *Thomisus cherapunjius* : Tikader, *Proc. Indian Acad. Sci.*, 64 (1): 54.

1980. *Thomisus cherapunjius* : Tikader, *Fauna of India*, Thomisidae 1 (1): 54.

1992. *Thomisus cherapunjius* : Biswas and Biswas, *Fauna of West Bengal*, Araneae, Part-3: 408.

2005. *Thomisus cherapunjius* : Majumder, *Mem. Zool. Surv. India*, 20 (3): 52

2009. *Thomisus cherapunjius* : Biswas, *Encyclopedia of flora and fauna of Bangladesh*, Arachnida, 18 (1): 357.

2015. *Thomisus cherapunjius* : Platnick, *World Spider Catalog*, Version 15.0, <http://www.research.amnh.org/iz/spider/catalog/intro.html>

2023. *Thomisus cherapunjius* : *World Spider Catalog*, Version 23.0, Natural History Museum, Bern., online at- <http://www.wsc.nmbe.ch> (accessed on 7th Febr., 2023)

Materials examined: 1 female and 1 male, Bagerhat, Bangladesh, 18. V. 1990, Coll. V. Biswas; 1 female, Barisal, Bangladesh, 25. VI. 1991, Coll. V. Biswas; 1 female, Jashore, Bangladesh, 12. VI. 1990, Coll. V. Biswas; 2 female, Jhenaidah, Bangladesh, 28. VII. 1990 and 05. VIII. 1992, Coll. V. Biswas; 2 female and 1 male, BARI, Jashore, Bangladesh, 25. VII. 1990, Coll. V. Biswas; 2 females, Khulna, Bangladesh, 20. X. 1991, Coll. V. Biswas; 1 female, Satkhira, Bangladesh, 15. V. 1992, Coll. V. Biswas.

General: Body small to medium in size. Cephalothorax and legs green; abdomen mixed with brown and dirty

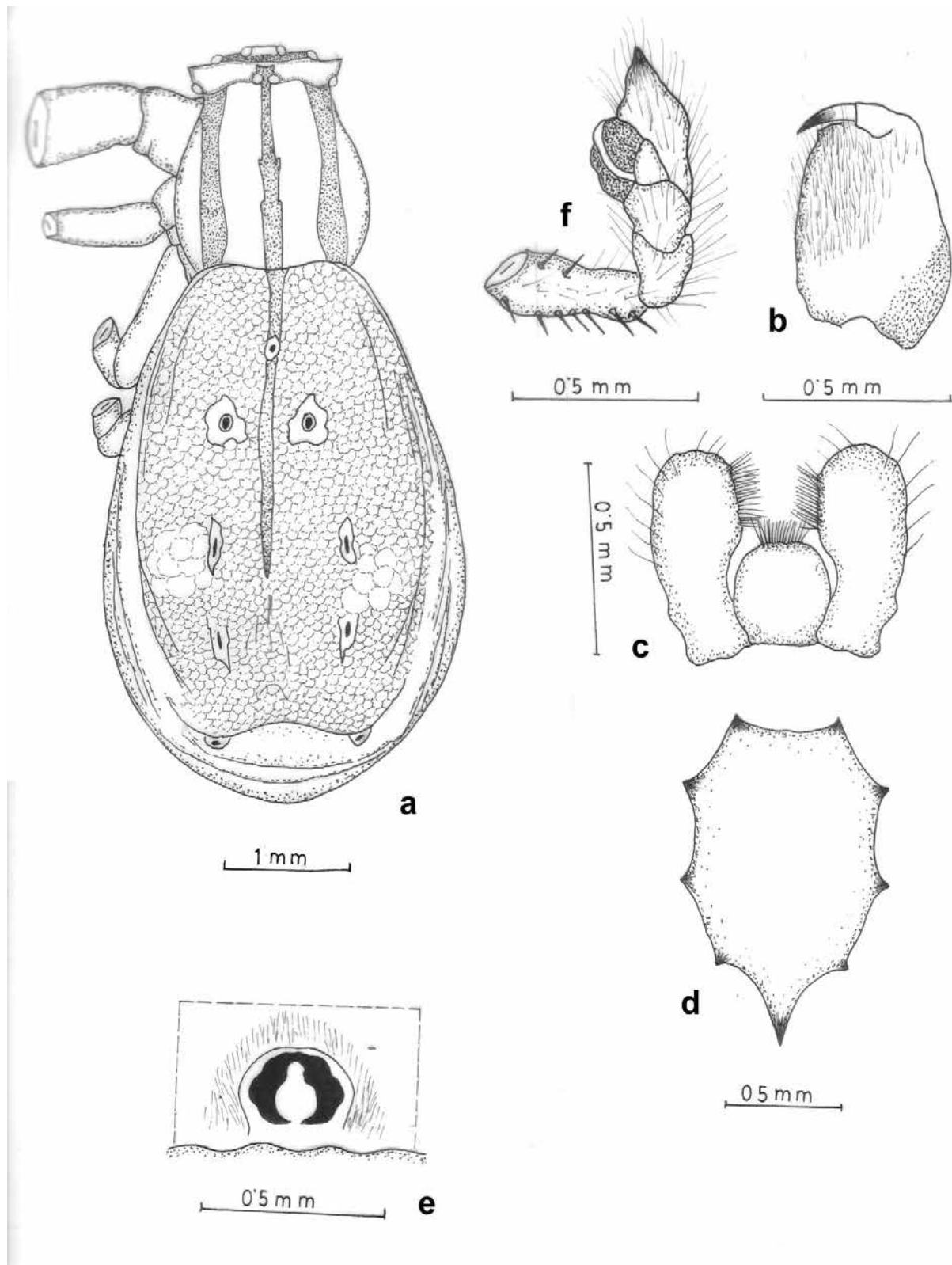


Figure 2. *Thomisus cherapunjius* Tikader a. Whole body (dorsal view); b. Chelicerae; c. Maxillae and Labium; d. Sternum; e. Epigynum; f. Male palp

Table 2. Measurements (mm) of leg segments of *T. cherapunjius* Tikader

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.00/2.00	0.80/0.80	2.00/2.00	2.00/2.00	0.80/0.80	7.60/7.60
II	2.00/2.00	0.80/0.80	1.90/1.90	2.00/2.00	0.80/0.80	7.50/7.50
III	1.00/1.00	0.30/0.30	0.80/0.80	0.80/0.80	0.30/0.30	3.20/3.20
IV	1.50/1.50	0.30/0.30	0.80/0.80	0.50/0.50	0.30/0.30	3.40/3.40

white. Total body length (female) 5.40 mm. carapace 2.00 mm long, 1.80 mm wide ; abdomen 3.40 mm long and 2.50 mm wide. Total body length (male) 5.00 mm. Carapace 2.00 mm long, 1.60 mm wide ; abdomen 3.00 mm long and 2.50 mm wide.

Cephalothorax: Slightly longer than wide, clothed with fine hairs ; cephalic region slightly raised, narrowing anteriorly ; dorsum with 2 dark brown, lateral longitudinal bands ; ocular tubercle chalk-white, high, produced laterally, pointed and transversely joined with an elevated ridge ; a narrow longitudinal chalk-white band extending mid-dorsally from ocular area to the base of thorax. Eyes black ; anterior row recurved and shorter than the straight posterior row ; lateral eyes placed on the base of lateral conical tubercle; posteromedians closer than the anteromedians, posterolaterals distinctly placed ; ocular quad longer than wide and narrowing posteriorly. Chelicerae thick, brownish, fang segmented, fang furrow with 1 tooth on inner margin (Fig. 2b). Maxillae longer than wide, anteriorly wide and scopulate (Fig. 2c). Labium globose, medially broad and anteriorly scopulate (Fig. 2c). Sternum elongate, wide medially, posteriorly produced and pointed, clothed with fine hairs (Fig. 2d). Legs long and slender, I and III very long; tibiae and metatarsi I with 5 and 8 pairs of strong ventral spines; leg formula 1243 and the measurements (in mm) are shown in Table 2.

Abdomen: Longer than wide, wider posteriorly, nearly brinjal – shaped, anteriorly narrowing; dorsum with 3 pairs of brownish markings on the either side of dorso-median longitudinal chalk-white band extending from the anterior margin upto the 2/3rd of abdomen, marginally with 3 or 4 longitudinal brown lines; ventrally pale green; epigyne as in fig. 2e.

Distribution: Bangladesh: Bagerhat, Barisal, Jashore, Jhenaidah, Khulna and Satkhira; India (Biswas, 2009; Tikader, 1966, 1980).

Conclusion

Spiders of the genus *Thomisus* Walckenaer are one of the important and attractive members in the crop-fields and gardens. From the taxonomic history of these spiders of Bangladesh (Chowdhury and Pal 1984; Okuma *et al.* 1993; Biswas 1995, 2009; Biswas *et al.* 1993; Begum and Biswas 1997), it is found that there is no previous record on these spiders and both the described species are the new record for the area of present study. From this study, it is also observed that there are some variable characters like- colour, shape, size etc. found in these species which varies with the Indian fauna.

In the behaviour, both these species are natural predators of the crop-fields and garden pest insects. They consume the preys by a peculiar manner both from the plant leaves and flowers. Majority of the members of this genus stay on petals of colourful flowers for the preys showing mimicry. Therefore, these are also called the ‘flower spiders’ and are considered as one of the important biological control agents of crop pests.

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