

STUDY ON ORB-WEAVING SPIDERS OF BANGLADESH-III: GENUS *ARGIOPE* AUDOUIN (ARANEAE : ARANEIDAE)

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ABSTRACT

This is the third step of studies carried out on the orb-weaving spider genus *Argiope* Audouin from Bangladesh. Two species were recorded in this study of which one species *A. reticulata* n. sp. is reported as new to science and another one *A. shillongensis* Sinha is a new record for the area of present study. Generic diagnosis, illustrated description and distribution of the species are presented herewith.

Keywords: Orb-weaving spider, New species, *Argiope*, Araneae, Araneidae.

INTRODUCTION

Spiders of the genus *Argiope* Audouin are one of the common orb-weaving members of garden and forests of Bangladesh. They are very attractive due to the metallic colour, dorsal decoration, peculiar orb-weaving behaviour and the geometric webs. Their webs are larger with 2 (two) stabilimenta crossings. The spiders always stay on the middle of the web spreading the legs in pairs that appears like "X" (Tikader 1982).

Genus *Argiope* is distributed throughout the world of which majority of the species are in Asian countries (Silwal & Molour 2007, Kim & Lee 2012, Keswani *et al.* 2012). Till date, the genus contains 85 species in the world fauna (World Spider Catalog 2017) of which 16 species described in the Indian Sub-continent and only 8 (eight) species are recorded in the fauna of Bangladesh (Biswas *et al.* 1993, Okuma *et al.* 1993, Begum & Biswas 1997, Biswas 2009, Biswas & Raychaudhuri 2015, 2017).

The present paper contains description of a new species *A. reticulata* n. sp. and another newly recorded one, *A. shillongensis* Sinha together with their generic diagnosis, distribution and key to the species.

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MATERIALS AND METHODS

Specimens of this study were collected from the webs by vial tapping and jarking the branches of the trees on the inverted umbrella in the early morning from Bagerhat, Bangladesh. Collected specimens were preserved in 70% alcohol temporarily for the study and Audmans' preservatives permanently (Lincoln & Sheals 1985). All the laboratory methods were followed as described by Levi (1965) and Tikader (1987).

Preserved specimens were studied following Levi (1968), Tikader (1982), Bjorn (1997), Yin *et al.* (1997), Barrion and Litsinger (1995), Yaginuma (1986), Roberts (1985), Davies (1988), Tanikawa (2007) and fauna volumes on Araneidae. Finally, identity of the species were confirmed from the Zoological Survey of India, Kolkata.

All the laboratory studies were made under Stereo Zoom Binocular Microscope in the Entomology laboratory, Department of Zoology, University of Calcutta. Illustrations were made by Camera lucida fitted with Binocular Microscope and necessary photographs were taken by Canon Digital Camera fitted with 90 mm macro zoom lens. All the measurements of different body parts were taken in millimeters (mm).

The types are at present in the collection of the Department of Zoology, Khulna Government Womens' College, Khulna, Bangladesh.

RESULTS AND DISCUSSION

Taxonomy

Family : ARANEIDAE Latreille, 1806
Genus : *Argiope* Audouin, 1826
Type-species : *Argiope lobata* (Thorell)

1826. *Argiope* Audouin, *Description de l' Egypte*, **1**(4) : 121.
1829. *Argiope* : Latreille, *Les. Arach. Regne Animal*, **4** : 248.
1895. *Argiope* : Simon, *Hist. Nat. Araign.*, **1**(4) : 769.
1900. *Argiope* : Pocock, *Fauna Brit. India, Arachn.*, : 220.
1921. *Argiope* : Gravely, *Rec. Indian Mus.*, **22** : 412.
1968. *Argiope* : Levi, *Bull. Mus. Comp. Zool. Harv.*, **136**(9) : 319.
1970. *Argiope* : Tikader, *Rec. Zool. Surv. India*, **64** (1-4) : 27.
1982. *Argiope* : Tikader, *Fauna of India, Araneae, Spiders*, **2**(1) : 111.

1986. *Argiope* : Yaginuma, *Spiders of Japan in colour* : 113.
1991. *Argiope* : Chen & Zhang, *Fauna of Zhejiang. Araneida* : 82.
1995. *Argiope* : Barrion & Litsinger, *Riceland spiders of South and SE Asia* : 569
1997. *Argiope* : Platnick, *Advances in Spider Taxonomy* : 489.
1997. *Argiope* : Yin *et al.*, *Fauna Sinica, Araneae, Araneidae* : 63.
1997. *Argiope* : Mikhailov, *Cat. spiders of former Soviet Union* : 116.
2007. *Argiope* : Buchar & Ruzicka, *Cat. Spiders of Czeck Republic* : 109
2009. *Argiope* : Biswas (Ahmed ed.) *Flora & Fauna of Bangladesh, Arachn.* 18(1) :
2012. *Argiope* : Kim & Lee, *Invertebrate fauna of Korea*, **21**(6) : 43.
2017. *Argiope* : *World Spider Catalog*, version 18.0, Nat. Hist. Mus., Bern.,
<http://wsc.nmbe.ch>. (accessed on 07.12.17)

Diagnosis: Body small to medium with beautifully decorated abdomen. Cephalothorax flat with distinct fovea; thoracic region oval. Lateral eyes close and situated on a prominent tubercle; anterolateral smaller than posterolaterals. Chelicerae small and with small boss. legs long and strong, always spreading on the web in pairs which appears as 'X'; metatarsus and tarsus together longer than patella and tibia.

Abdomen flat variously shaped in different species; dorsum beautifully decorated. Adult females larger than males; epigyne with thin or thick long median septum.

Distribution: AMERICA, ASIA, AUSTRALIA, EUROPE.

Key to the species

1. Abdomen anteriorly not reticulate; outer margin of chelicerae with 2 teeth; sternum medially white; epigyne as in Fig, 1, e. *shillongensis*
- Abdomen anteriorly reticulate; outer margin of chelicerae without any tooth; sternum medially reticulate; epigyne as in Fig, 2, e *reticulata* n. sp

1. *Argiope shillongensis* Sinha

(Figs. 1 a-f; Plate-I, b)

1951. *Argiope shillongensis* : Sinha, *Rec. Indian Mus.*, **49**:75
1982. *Argiope shillongensis* : Tikader, *Fauna of India, Araneidae*, **1**:117.
2004. *Argiope shillongensis* : Majumder, *Mem, Zool, Surv. India*, **20**(2) : 7
2009. *Argiope shillongensis* : Biswas : In Ahmed (ed.) *Encyclopedia of Flora & Fauna of Bangladesh, Arachn.*, **18**(1) : 137.
2015. *Argiope shillongensis* : Biswas & Raychaudhuri, *J. Nat. Univ.* **1**(2) : 85.
2017. *Argiope catenulata* : *World Spider Catalog*, version 18.0, Nat. Hist. Mus., Bern., (accessed on 07.12.17)

Material examined: 1♀, BARI, Jessore, 12.V. 1992, Coll. V. Biswas; 1♀, Tangail, 18.VI. 1993, Coll V. Biswas, 1♀, Rajshahi, 3. III. 1993, Coll. V. Biwas.

General: Cephalothorax and legs yellow with black markings; abdomen chalk-white with blackish brown bands. Total body length 10.30 mm. Carapace 4.70 mm long, 4.00 mm wide; abdomen 5.60 mm long and 5.40 mm wide (Fig. 1a).

Distribution: BANGLADESH : Jessore, Rajshahi, Tangail; INDIA (Sinha 1951, Tikader 1982).

2. *Argiope reticulata* n. sp

(Figs. 2. a-e; Plate I. a)

Material examined: 1♀, Bagerhat, 12. V. 1992, Coll. V. Biswas (holotype); 1♀, Jhalokati, Barisal, 18. IX. 1992. Coll. V. Biswas (Paratype).

General: Cephalothorax and legs yellow with blackish markings; abdomen chalk-white with brown black band. Total body length 10.25 mm. Carapace 4.70 mm long, 4.00 mm wide; abdomen 5.55 mm long and 5.50 mm wide (Fig. 2a).

Cephalothorax: Ovoid, posteriorly broad and anteriorly narrowed, anterior margin with 2 concave slopes forming 3 protuberance; dorsally with a deep, conspicuous, round central forea encircled with distinct radii and anterior 'V'-shaped markings. Eyes pearly-white anterior row strongly recurved while posterior row procurved; anteromedians and the lateral eyes situated on a protuberance and nearly equal, posteromedians larger than others. Chelicerae broad, strong, wide basally, with 2 teeth on inner margin (Fig, 2 b). Maxillae brown, long, medially broad and scopulate (Fig. 2 c). Labium brown, pot-like, with angles produced, scopulate anteriorly (Fig. 2,c). Sternum brownish, nearly heart-shaped, reticulate posteriorly, bluntly pointed, anteriorly concave (Fig, 2 d). Legs long and slender, clothed with spines and hairs; leg formula 1243 and the measurements (mm) as shown in Table 1.

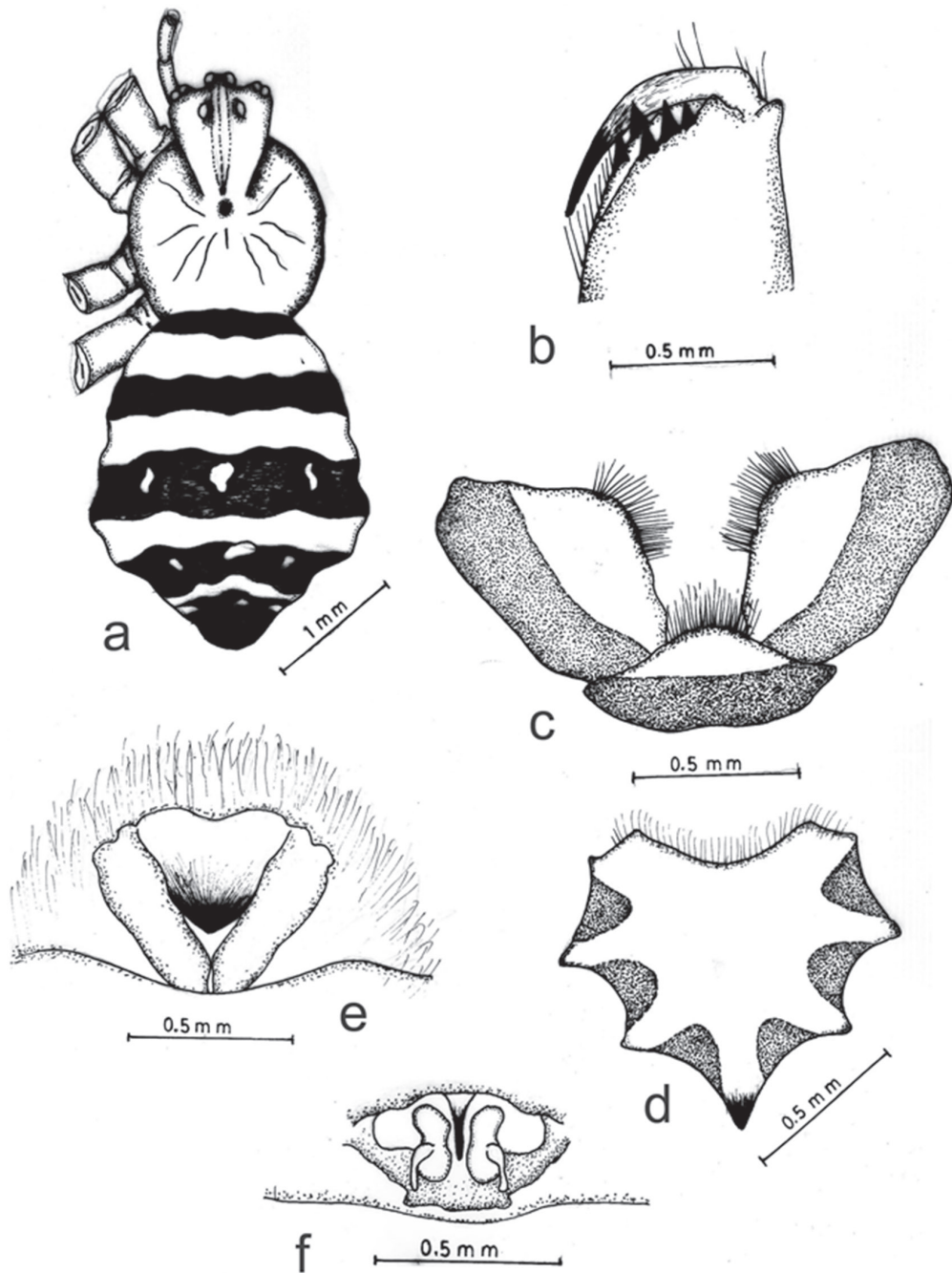


Fig. 1. *Argiope shillongensis* Sinha, a. Whole body (dorsal view); b. Chelicerae; c. Maxillae and Labium; d. Sternum; e. Epigynum; f. Internal genitalia

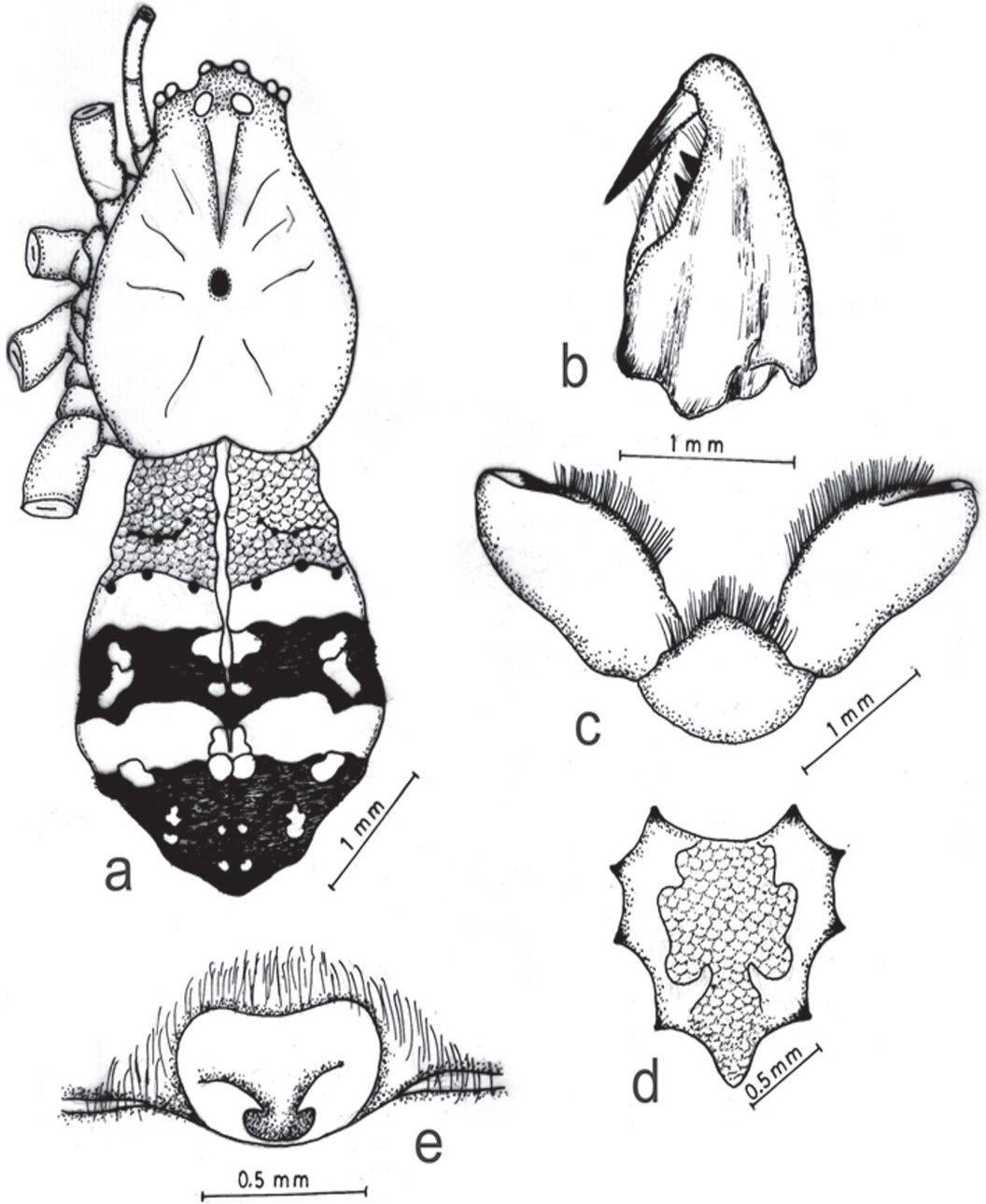


Fig. 2. *Argiope reticulata* n. sp. a. Whole body (dorsal view); b. Chelicerae; c. Maxillae and Labium; d. Sternum; e. Epigynum

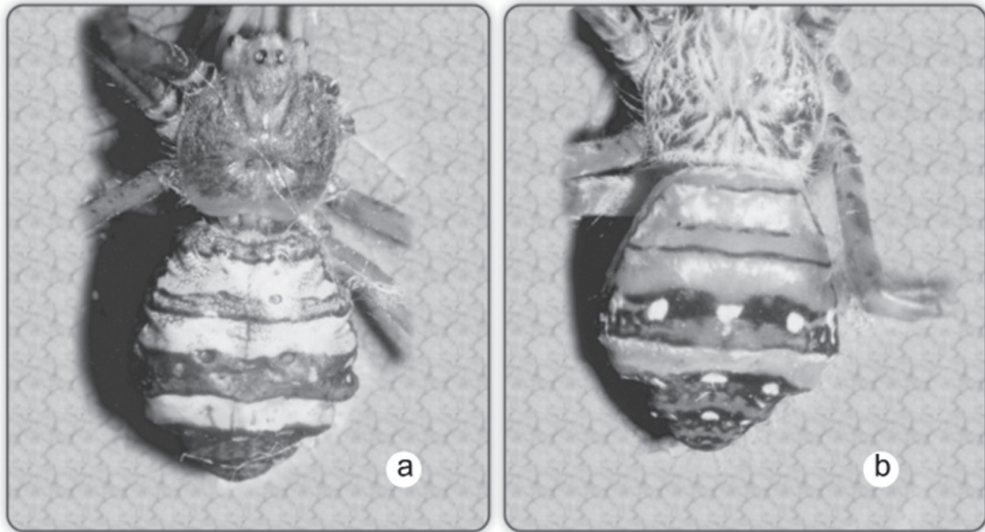


Plate I. a. *Argiope reticulata* n. sp.; b. *Argiope shillongensis* Sinha

Table 1. Measurements (mm) of leg segments of *Argiope reticulata* n. sp

Leg	Femur	Petella	Tibia	Metatarsus	Tarsus	Total
I	5.10/5.10	1.50/1.50	3.50/3.50	4.80/4.80	1.50/1.50	16.40/16.40
II	5.00/5.00	1.50/1.50	3.00/3.00	5.00/5.00	1.80/1.80	16.30/16.30
III	3.00/3.00	1.00/1.00	1.50/1.50	3.00/3.00	1.00/1.00	9.50/9.50
IV	4.50/4.50	1.50/1.50	3.00/3.00	4.50/4.50	1.80/1.80	15.30/15.30

Abdomen: Broad, nearly oval, posteromedially wide; posterior extremity bluntly pointed; dorsum decorated with black and white band; epigyne as in Fig. 2,e.

Male: Unknown.

Holotype: Female in spirit.

Type-locality: Bagerhat and Barisal, Bangladesh, Coll. V. Biswas.

Etymology: The species is named due to the reticulate nature of the sternum and abdomen.

Remarks: Typical epigyne, reticulate anterior 1/3rd of abdominal dorsum and sternum of the new species sufficiently separate it out from the other congeners known from India (Tikader 1982), Japan (Shinkai & Takano 1984, Yaginuma 1986), Singapore (Koh 1989), Korea (Nam Kung 2002, Kim & Lee 2012) and China (Chen & Zheng 1991, Zhao 1993, Yin *et al.* 1997).

Therefore, the species is described as new to science.

CONCLUSION

Studies on the genus *Argiope* Audouin was undertaken due to their beautiful appearance and predatory role in the crop-fields and gardens. From the taxonomic records on the study of spiders of Bangladesh (Biswas 1995, 2009, Okuma *et al.* 1993, Biswas *et al.* 1993, Begum & Biswas 1997) it was found that of these two species one was identified as new to science and another one *A. shillongensis* earlier described from Bangladesh (Biswas & Raychaudhuri 2015).

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