

First report of *Araneus marmoreus* Clerck, 1757 from India (Araneae, Araneidae)

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SARKAR, I. D., SILIWAL, M. & UNIYAL, V. P.: *First report of Araneus marmoreus Clerck, 1757 from India (Araneae: Araneidae)*.

Abstract: The paper provides the first occurrence report of *Araneus marmoreus* Clerck, 1757 from India, based on both male and female specimens from the village of Keylong, Lahaul and Spiti district, Himachal Pradesh. Global distribution of the species ranges from North America in the west to Japan in the east (holarctic distribution), with no prior record from India.

Keywords: Orb-web weaver, Trans-Himalayas, first report, Himachal Pradesh, spider

Introduction

Araneidae Clerck, 1757 represents the third most-speciose family within the order Araneae, typically represented by conventional orb web weavers, globally represented by 3119 species across 188 genera (World Spider Catalog 2023 (WSC)). Members of the family are widely distributed globally and appear to be relatively easy to study and determine. However, much of them remain inadequately studied and incompletely described (SESTAKOVA et al. 2009).

The genus *Araneus* Clerck, 1757 represents one of the most speciose and widely distributed groups currently housing 555 species, of which 22 are reported from India (World Spider Catalog, 2023). Over the years, several taxonomists have attempted to systematically study and/or categorize members of the genus from various geographic regions (e.g., SIMON 1929, WIEHLE 1931, LOCKET & MILLIDGE, 1953, TIKADER & BAL 1982). Although members of the genus occur commonly across the Indian sub-continent, much of the taxonomic literature date back to 1800s-1900s (see O. PICKARD-CAMBRIDGE 1885, SIMON 1889, STRAND 1907, TIKADER & BAL 1982) with very few recent updates. SINGH & GARIMA (2021) listed 39 species of *Araneus* from India, few of which were taxonomically revised to other genera, and 20 species were enlisted with distribution in the Western Himalayas. However, upon cross-referencing with WSC (2023), only 8 species can be confidently placed within Indian Western Himalayas, followed by 7 species with distribution in Pakistan, and 4 species whose distribution remains debated between the two countries. SINGH & GARIMA (2021) also reports the presence of *A. diadematus* Clerck, 1757 from India, although it remains to be confirmed on the WSC (2023).

The species *Araneus marmoreus* Clerck, 1757 has a wide global distribution ranging from North America in the west to Japan in the east, with Asian reports spanning Central

Asia, China, Korea, and Japan. However, the species remains unreported from India. During systematic elevational surveys in the Indian Trans-Himalayas, several specimens of *A. marmoreus* were collected from the village of lower Keylong, Lahaul and Spiti district, Himachal Pradesh, India, thereby providing the first report of the species from the Indian Himalayas.

Material and methods

Spiders were actively collected from orb-webs made around concrete human settlements from lower Keylong village, Himachal Pradesh, India. Specimens were preserved in 70% alcohol followed by examination under a stereomicroscope and genus identification based on SESTAKOVA et al. (2009). Epigyne and left palp were dissected and cleaned using lactic acid. Photographs and measurements were taken using MICAPS camera attachment with Carton DSZ-45T microscope and ToupView software. All measurements are in mm. Specimens are deposited at the Wildlife Information Liaison Development Society (WILD), Coimbatore, Tamil Nadu, India.

Abbreviations: AER – Anterior Eye Row, ALE – Anterior Lateral Eyes, AME – Anterior Median Eyes, BL – Basal Lamellae, fe – femur, C – Conductor, LP – Lateral Plates, MA – Median Apophysis, mt – metatarsus, pa – patella, PER – Posterior Eye Row, PLE – Posterior Lateral Eyes, PME – Posterior Median Eyes, S – Scape, STA – Sub-terminal Apophysis, TA – Terminal Apophysis, ta – tarsus, ti – tibia, WILD – Wildlife Information Liaison Development Society.

Results

Family **Araneidae** Clerck, 1757

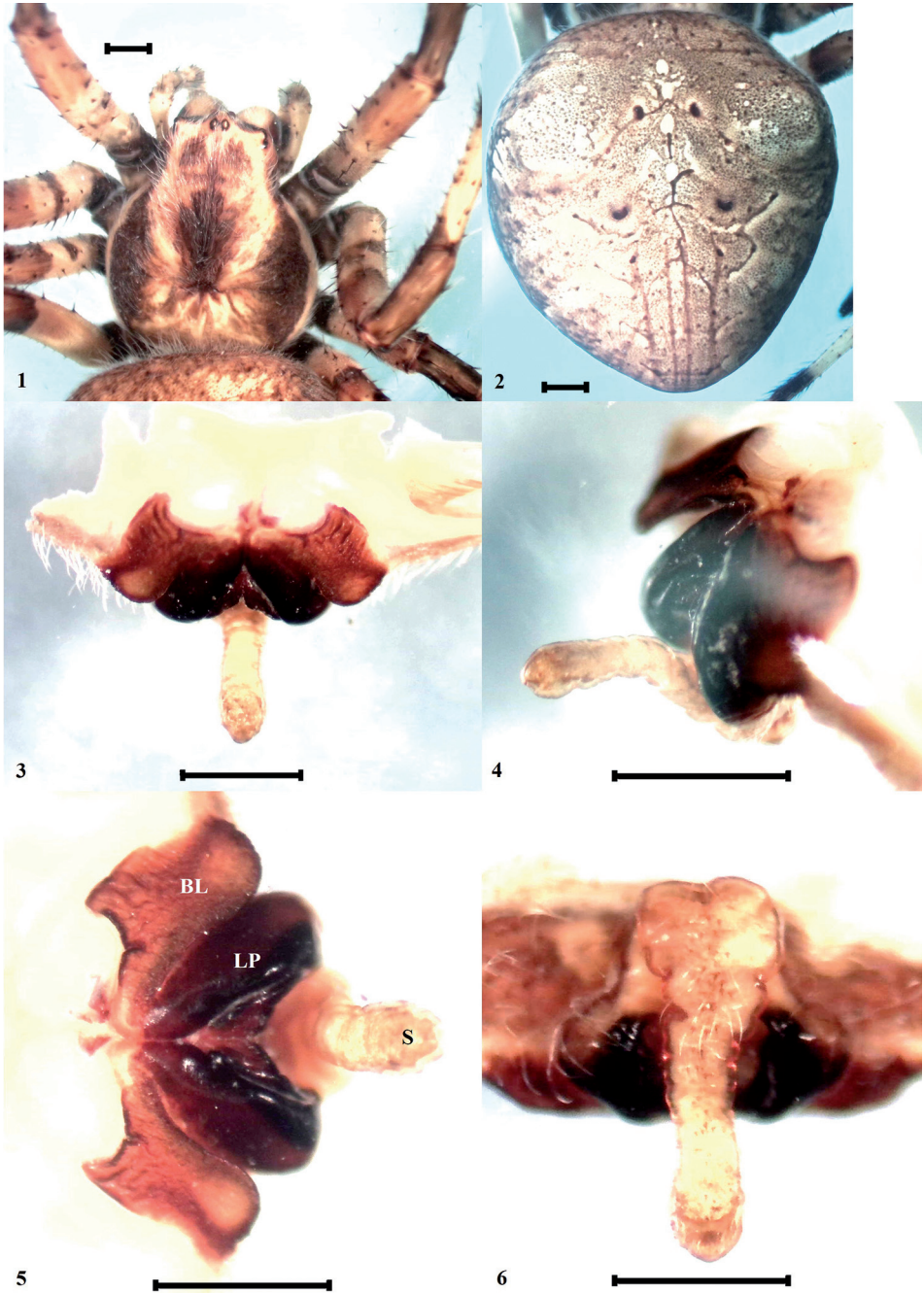
Genus *Araneus* Clerck, 1757

Type species: *Araneus angulatus* Clerck, 1757

Araneus marmoreus Clerck, 1757 (Figs: 1-14.)

Material examined: 3 females, WILD-21-ARA-1630, WILD-21-ARA-1631, WILD-21-ARA-1632, Keylong, Lahaul and Spiti, Himachal Pradesh, 32°34'19.18"N, 77° 1'27.32"E, 3078m. 17 August 2021. Coll. Irina Das Sarkar. 3 males, WILD-21-ARA-1633, WILD-21-ARA-1634, WILD-21-ARA-1635. Same data as female.

Description. Female (Figs 1-6). Cephalothorax length 6.14, width 5.34, light brown with darker median and lateral bands, the former concentrated around fovea; ocular region bearing pallid white hair. Fovea distinct, slit-like with radiating striae towards lateral margins. AER procurved, PER almost straight. Eye measurements: AME 0.18, ALE 0.15, PME 0.18, PLE 0.15. Inter-eye distances: AME-AME 0.23, AME-ALE 0.74, PME-PME 0.07, PME-PLE 0.93, ALE-PLE 0.06. Sternum length 2.63, width 2.44, dark brown with wavy lateral margins, bluntly pointed posteriorly. Endites length 1.29, width 0.98. Labium length 0.80, width 1.13. Chelicerae with condyles, length 2.28, width 1.38, 4 (right) and 3 (left) promarginal teeth and 3 retromarginal teeth. Legs strong, with numerous robust spines of varying lengths that are more pronounced in anterior legs; distal end of each segment dark brown, anterior half yellow-brown. Leg measurements

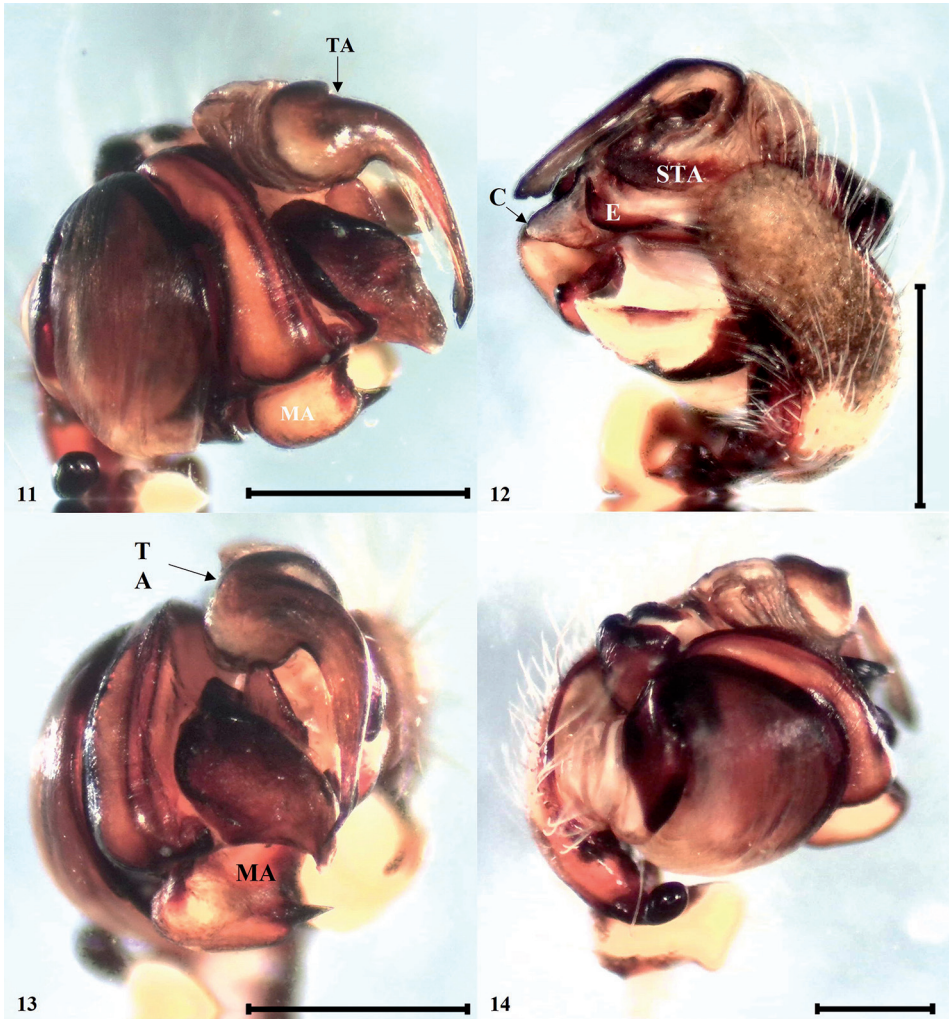


Figs 1-6: *Araneus marmoreus* Clerck, 1757 Female. 1. Cephalothorax, dorsal. 2. Abdomen, dorsal. 3, 5. Epigyne, ventral. 4. Epigyne, lateral. 6. Scape, close-up. Scale 0.5 mm.



Figs 7-10: *Araneus marmoreus* Clerck, 1757 Male. 7. Habitus, dorsal. 8. Spines on Tibia II. 9. Coxa II spur. 10. Abdomen, dorsal. Scale 0.5 mm.

(fe, pa, ti, mt, ta, total): I fe 6.37 pa 2.90 ti 5.51 mt 5.24 ta 1.78 (21.8), II fe 4.98 pa 2.77 ti 5.09 mt 4.79 ta 1.81 (19.44), III fe 4.46 pa 1.96 ti 2.95 mt ta 2.55 1.25 (13.17), IV fe 6.15pa 2.52 ti 4.90 mt 4.32 ta 1.34 (19.23). Leg formula 1243. Abdomen length 10.27, width 9.40, brown with white marbled pattern, oval, anterio-laterally with two prominent humps; three pairs of distinct brown spots and irregularly shaped white spots on mid-dorsal plane, middle spots larger; prominent folium pattern arising from base of humps and continuing posteriorly with distinct transverse lines forming a four-pronged pattern; folium margins less distinct posteriorly. Epigyne (Figs 2-6) ventrally with medium



Figs 11-14: *Araneus marmoreus* Clerck, 1757 Male. 11, 13. Palp, retrolateral. 12. Palp, pro-lateral. 14. Palp showing paracymbium, ventral. Scale 0.5 mm.

length scape, wrinkled, wider and thicker at base than apex, arched in lateral view, with one pair each of sclerotised basal lamellae (BL) and lateral plates (LP) placed close to each other forming winged shape; anterior margin of LP horn-shaped, BL bearing triangular notch from where scape arises.

Male (Figs 7-14). Total length 9.00, morphologically similar to female. Cephalothorax length 4.73, width 3.61. Anterior margin of ocular region bearing prominent notches between median and lateral eyes. Eye measurements: AME 0.16, ALE 0.12, PME 0.16, PLE 0.12. Inter-eye distances: AME-AME 0.18, AME-ALE 0.21, PME-PME 0.08, PME-PLE 0.59, ALE-PLE adjacent. Sternum length 2.02, width 1.41. Endites length 0.81, width 0.61. Labium length 0.47, width 0.73. Chelicerae with condyles, length 1.47, width 0.92, 4 promarginal teeth and 3 retromarginal teeth. Legs strong, with numerous

robust spines of varying lengths that are more pronounced in anterior legs; distal end of each segment dark brown, anterior half yellow-brown; ti II with two rows to clustered robust thorn-like spines dorsally and retrolaterally; coxa I bearing hook-shaped process on distal ends; coxa II bearing spurs near base of article (Fig 9). Leg measurements (fe, pa, ti, mt, ta, total): I fe 5.42 pa 2.34 ti 5.14 mt 4.15 ta 1.43 (18.48), II fe 5.05 pa 2.10 ti 4.03 mt 3.83 ta 1.27 (16.28), III fe 3.46 pa 1.49 ti 2.39 mt 2.12 ta 0.96 (10.42), IV fe 4.96 pa 1.95 ti 3.70 mt 3.44 ta 1.03 (15.08). Leg formula 1243. Abdomen length 5.45, width 3.89, similarly patterned as female with some differences; abdominal humps less prominent in males; five pairs of brown spots on mid-dorsal plane, anterior two pairs largest; white spots smaller and more evenly sized; folium with pronounced black wavy margins without posterior transverse lines. Palp (Figs: 11-13) bulbous and sclerotized; terminal apophysis (TA) long, wider at base, pointed apically, bent sharply downwards with translucent lateral membranes; sub-terminal apophysis (STA) triangular with blunt distal end, almost parallel to TA; embolus short with blunt distal tip, situated under TA; conductor translucent, triangular with broad blunt distal end; median apophysis (MA) with broad base, medial depression and sharply pointed distal tip; paracymbium strongly sclerotised, knob-shaped (Fig: 14).

Habitat. Several research highlights that the preferred habitat of the species includes sunny and moist forested areas with sufficient herbaceous growths, especially open grass habitats, meadows, and forest clearings (e.g., SESTAKOVA et al. 2009, ALMQUIST 2005, DONDALE et al. 2003, ROBERTS 1998). However, our findings contradict this affinity, corroborated by occurrences in heavily anthropogenized areas, with an affinity towards dingy abandoned corners under/beside concrete houses. All specimens were collected from orb-webs constructed around human habitations. Webs were preferentially constructed in open but shaded spaces within house structures such as under staircases, near drainages, and abandoned corners.

Distribution. North America, Europe, Turkey, Caucasus, Russia (Europe to Far East), Iran, Central Asia, China, Korea, Japan, India (new record).

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