J. Insect Biodivers. Syst. 11 (in press) *Paper in Press, Proofed, Available online 18 October, 2024* *https://jibs.modares.ac.ir*

OPEN ACCESS

Tarbiat Modares University Press | **Short Paper** | **ISSN**: 2423-8112
Entomological Society of Iran | Faunistic | *https://zoobank.org/urn:lsid:zoobank.org:D571A772-E07E-4887-ABC9-846BAECFDEA3*

The first record of *Evarcha pulchella* (Thorell, 1895) (Araneae: Salticidae) from Pakistan with the first description of its female

Pir Asmat Ali
Department of Zoology, Women University Swabi, Swabi, Pakistan.
pirasmat85@gmail.com *https://orcid.org/0000-0002-8309-1918*

Received: *May 15, 2024*
Accepted: *October 04, 2024*
Available online: *October 18, 2024*
Subject Editor: *Alireza Zamani*

ABSTRACT. The jumping spider *Evarcha pulchella* (Thorell, 1895) (Salticidae) is recorded for the first time in Pakistan, based on material from the subtropical Hindu Kush dry meadows and hills. The female of this species is described for the first time. Detailed diagnostic illustrations and photographs of specimens are provided.

Keywords: Hindu Kush, jumping spiders, morphological description, taxonomy

Citation: Ali, P.A. (2025) The first record of *Evarcha pulchella* (Thorell 1895) (Araneae: Salticidae) from Pakistan with the first description of its female. *Journal of Insect Biodiversity and Systematics*, 11 (in press).

INTRODUCTION

The salticid spider genus *Evarcha* Simon 1902 presently has 92 valid species distributed in the Holarctic, Afrotropical and Oriental regions (WSC, 2024). *Evarcha pulchella* (Thorell, 1895) was described from Myanmar (based on males) and rediscovered 128 years later from India (Trivedi et al., 2023). I found male specimens matching *E. pulchella* in a similar habitat, i.e., on grasses, alongside females of similar size and markings. As only one other distinctly different species, *E.* cf. *arabica* Wesolowska & Harten, 2007, has been reported in Pakistan (Ali, 2017), I interpret the females collected to be that of *E. pulchella*. In this paper, the female of *Evarcha pulchella* (Thorell, 1895) is described with detailed diagnostic characters presented for the first time. This work is part of an ongoing project focusing on documenting the Salticidae of Pakistan (Ali et al., 2016, 2018; Ali, 2021, 2024).

MATERIAL AND METHODS

Specimens were preserved in alcohol and examined under both dissecting microscopes and compound microscopes. Photographs of habitus were taken with an OMAX® 3MP camera attached to Olympus® microscope SD-30 and OMAX® stereomicroscope or IMERICO® Light microscope. Female genitalia were removed and cleared in 10% KOH. Laboratory work was carried out in the Department of Zoology, Women's University Swabi, Pakistan. Specimens are deposited in the Department of Zoology, Women University Swabi, Swabi, Khyber Pakhtunkhwa, Pakistan. Measurements are given in millimetres. Carapace length was measured from the base of the anterior median eyes (not including the lenses) to the rear margin of the carapace medially; carapace width was measured as maximum width; carapace height is maximum from lateral view. Abdomen length measured to the end of the anal tubercle, not including spinnerets; width is the maximum. Ocular area and eye row measurements include lenses of relevant eyes. Leg measurement as leg: total length (femur, patella, tibia, metatarsus, tarsus). Line drawings were traced on the micro-photographs in Adobe Illustrator 25.4.1, and were then processed and mounted in Photoshop 25.5.1 (Adobe Systems Inc., San Jose, USA). Terminology for the morphological term follows as Ali et al. (2018) and Trivedi et al. (2023).

Abbreviations. AER – anterior eye row, AME – anterior median eye, ALE – anterior lateral eye, PLE –

Corresponding author: Pir Asmat Ali, *pirasmat85@gmail.com*

posterior lateral eye, PME – posterior median eye, RTA – retrolateral tibial apophysis, E – embolus, At – atrium, FD – fertilization duct, Sp – spermatheca, SD – sperm duct. The examined specimens are deposited in the Department of Zoology, Women University Swabi, Swabi, Khyber Pakhtunkhwa, Pakistan (DZWUS).

RESULTS

Taxonomic hierarchy

Class Arachnida Lamarck, 1801

Order Araneae Clerck, 1757

Family Salticidae Blackwall, 1869

Subfamily Salticinae Blackwall, 1841

Tribe Plexippini Simon, 1901

Subtribe Plexippina Simon, 1901

Genus *Evarcha* Simon, 1902

Evarcha pulchella (Thorell, 1895) (Figs 1–11)

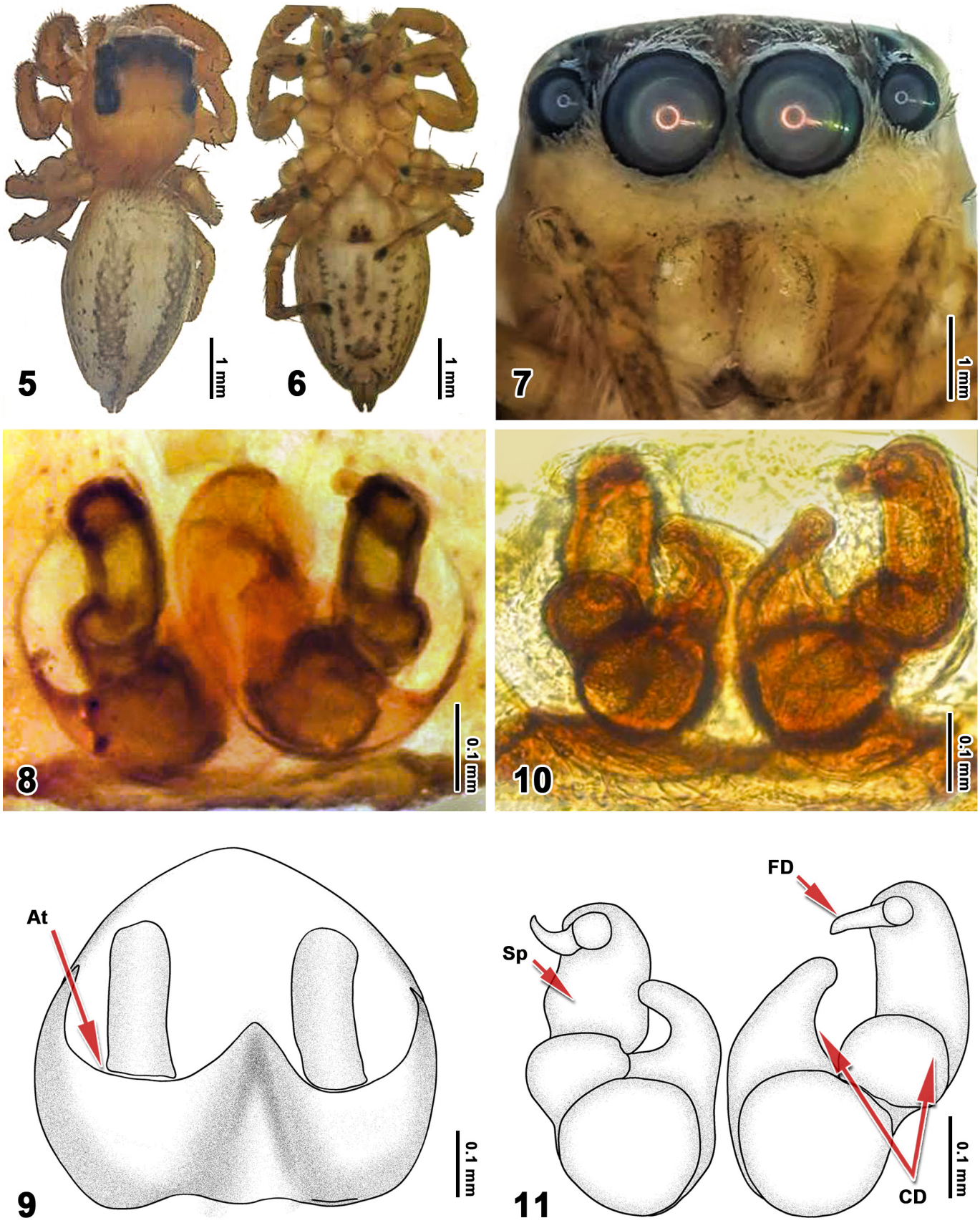
Ergane pulchella Thorell, 1895:391 (♂); *Eugasmia pulchella*: Roewer, 1955:1045; *Evarcha pulchella*: Prószyński, 1984:49 (♂); *Evacin pulchella*: Prószyński, 2018:142, fig. 6L (♂); *Evarcha pulchella*: Trivedi et al., 2023:131, figs, 1–13 (♂)

Materials examined. 1♂ (PAA#2022-06-140), PAKISTAN: Khyber Pakhtunkhwa: Swabi (Kotha village), 34°3'36"N, 72°34'48"E, 501 m., 29-VII-2022, handpicked from foothills and mud hills with long grasses (P.A. Ali). 1♂ (PAA#2022-06-141), and 1♂ (PAA#2022-06-142) same data as PAA#2022-06-140. 1♀ (specimen PAA#2022-06-143), Khyber Pakhtunkhwa: Swabi (Kotha village), 34°3'36"N, 72°34'48"E, 501 m., 29-VII-2022, collected from grasses on foothills and mud mounts on hand picking (P.A. Ali). 1♀ (PAA#2022-06-144), and 1♀ (PAA#2022-06-145) same data as PAA#2022-06-143.

Re-description. — **Male** (PAA#2022-06-140)**.** Habitus as in Figures 1–2. Carapace length 2.07, width 1.63, height 1.26. Abdomen length 1.98, width 1.29. For a detailed description see Trivedi et al. (2023). Palp as in Figures 3–4.

Female (PAA#2022-06-143)**.** Habitus as in Figures 5–7. Carapace length 2.33, width 1.98, height 0.99. Ocular area widest at PLE row; 1.89, width PME row 1.66, AER width 1.76. Abdomen length 2.38, width 1.89. Leg I: 4.07 (1.26, 0.66, 0.96, 0.62, 0.57). Leg II: 3.64 (1.16, 0.73, 0.65, 0.59, 0.51). Leg III: 5.04 (1.74, 0.83, 0.96, 0.87, 0.64). Leg IV: 3.97 (1.29, 0.57, 0.79, 0.83, 0.49).

Figures 1–4. *Evarcha pulchella* (Thorell 1895), male. **1.** Habitus, dorsal view; **2.** Habitus, lateral view; **3.** Palp, ventral view; **4.** Palp, retrolateral view. E = embolus, RTA = retrolateral tibial apophysis.



Figures 5–11. *Evarcha pulchella* (Thorell, 1895), female. **5.** Habitus, dorsal view; **6.** Habitus, ventral view; **7.** Face, frontal view; **8–9.** Epigyne, ventral view; **10–11.** Endogyne, dorsal view. At = atrium, FD = fertilization duct, Sp = spermatheca, CD = copulatory duct.

Carapace flat at cephalic region, thoracic area slopes gently. Chelicerae with two promarginal teeth and one retro-marginal tooth. Abdomen elongated. Posterior lateral spinnerets longer than others. Epigyne (Figs 8, 9) with broad forwarded-opening atrium; copulatory ducts turning medially, leading to vertical spermathecae anteriorly opening into fertilization ducts. Carapace brown, with cephalic sides black covered by black and white bristles traces. Eye field from ALE to PE with black integument and bristles, AME pale brown with pale setae. Clypeus almost pale covered with pale and scarce white setae; chelicerae light brown to pale towards apex with brown fangs, sternum pale yellow. Legs pale to yellow. Abdomen dorsum light grey with scattered dark dots, laterally a pair of dark grey to black bands enclosing central light grey band; venter light grey with scattered dark grey to black dots. Spinnerets pale with dark tips.

Remarks. The female of *Evarcha pulchella* can be distinguished from congeners by the broad forward-opening atrium (Figs 8, 9). There are other congeners with broad atria that open anteriorly, namely: *E. arcuata* (Clerck, 1757) (Peng, 2020: figs. 171, 173), *E. falcata* (Clerck, 1757) (Metzner, 1999: fig. 111d), and *E. michailovi* Logunov, 1992 (Logunov, 1992: fig. 3a–b). The epigynes of *E. michailovi* and *E. arcuata* are perhaps most similar to that of *E. pulchella*, in that the atrium faces directly to the anterior, but it is more spacious in *E. arcuata* and the distinctive fold of *E. pulchella* is lacking.

DISCUSSION

Predictions for expanding the *Evarcha pulchella* in Pakistan as chorotype species adapt to the subtropical, temperate, and ecotone regions of the Hindu Kush and Himalayan mountains. Previously, *Bianor albobimaculatus* (Lucas, 1846), *Hasarius adansoni* (Audouin, 1826), *Langona tartarica* (Charitonov, 1946), *Menemerus marginatus* (Kroneberg, 1875), *Menemerus nigli* Wesołowska & Freudenschuss, 2012, *Myrmarachne melanocephala* (MacLeay, 1839), *Plexippus clemens* (O. Pickard-Cambridge, 1872), *Plexippus paykulli* (Audouin, 1826), *Rhene flavigera* (C.L. Koch, 1846), *Rudakius ludhianaensis* (Tikader, 1974), *Telamonia dimidiata* (Simon, 1899), and *Thyene bivittata* (Xie & Peng, 1995) have been documented as chorotypes, confirming the range expansions of Oriental, African, Palaearctic, Pan-Himalayan, and Hindu Kush eurytopic species into Pakistan (Ali et al., 2016, 2018; Ali, 2021; Azarkina, 2004, 2019; Caleb et al., 2019; Logunov, 2021; Majeed & Butt, 2018; Sajid et al., 2020; WSC, 2024).

AUTHOR'S CONTRIBUTION

The author confirms his contribution to the whole processing steps in the research, conceptualization, collecting the specimens, preparation of the manuscript and illustrations. He read and approved the final version of the manuscript.

FUNDING

This research received no specific grant from any funding agencies.

AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the Department of Zoology, Women University Swabi, Swabi, Khyber Pakhtunkhwa, Pakistan and are available from the curator, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The author declares that there is no conflict of interest regarding the publication of this paper.

ACKNOWLEDGMENTS

I acknowledge a grant from the Women's University Swabi, for the Pakistani spider online checklist for the World Wide Web and IUCN. Special thanks to John Caleb (Saveetha Institute of Medical and Technical Sciences, India) for species confirmation. I gratefully acknowledge Danniella Sherwood (Arachnology Research Association, London, UK) for her helpful comments and improved image plates for the manuscript and Kiran Marathe (UBC, Canada) for constructive comments on the manuscript. I extend a heartfelt thanks to an anonymous reviewer for the constructive comments on the manuscript and to Dr Alireza Zamani, University of Turku, Finland for his editorial efforts.

REFERENCES

Ali, P.A. (2017) *Biodiversity and Molecular Characterization of Spiders Fauna in Khyber Pakhtunkhwa Pakistan*. Unpublished PhD thesis, Islamia College University Peshawar. 153 p. Available from: https://prr.hec.gov.pk/jspui/handle/123456789/11560

Ali, P.A. (2021) A new record of genus *Icius* Simon, 1876 for jumping spiders (Araneae: Salticidae) of Pakistan. *Natural and Applied Sciences International Journal*, 2, 80–86. https://doi.org/10.47264/idea.nasij/2.1.7

Ali, P.A. (2024) The Checklist of Spiders (Arachnida: Araneae) of Pakistan online at https://www.spidersofpakistan.com.pk/ [Accessed September 01, 2024]

Ali, P.A., Maddison, W.P. & Zahid, M. (2016) Documenting the subtribe Aelurillina from the Hindu Kush region of Pakistan. *Denver Museum of Nature and Science Reports*, 3, 1–38.

Ali, P.A., Maddison, W.P., Zahid, M., & Butt, A. (2018) New chrysilline and aelurilline jumping spiders from Pakistan (Araneae, Salticidae). *ZooKeys*, 783, 1–15. https://doi.org/10.3897/zookeys.783.21985

Azarkina, G. (2004) Two new species of the genus *Aelurillus* Simon, 1884 from Pakistan and Sri Lanka (Araneae: Salticidae). *Bulletin of the British Arachnological Society*, 13, 49–52.

Azarkina, G.N. (2019) A new species of *Aelurillus* Simon, 1884 (Aranei: Salticidae) from Thailand, with the first description of the male of *A. afghanus* Azarkina, 2006. *Arthropoda Selecta*, 28, 408–416. https://doi.org/10.15298/arthsel.28.3.05

Caleb, J.T.D., Prajapati, D.A. & Ali, P.A. (2019). Redescription of *Rudakius ludhianaensis* (Tikader, 1974) (Aranei: Salticidae), with notes on its synonymy and distribution. *Arthropoda Selecta*, 28, 3417–423. https://doi.org/10.15298/arthsel.28.3.06

Logunov, D.V. (1992) The spider family Salticidae (Araneae) from Tuva. II. An annotated check list of species. *Arthropoda Selecta*, 1, 47–71.

Logunov, D.V. (2021). Notes on the genus *Chinattus* Logunov, 1999 from India, Pakistan and Nepal (Arachnida: Araneae: Salticidae). *Zootaxa*, 5006, 110–120. https://doi.org/10.11646/zootaxa.5006.1.15

Majeed, N. & Butt, A. (2018) A Checklist of family Salticidae (Arachnida: Araneae) from some localities of Pakistan. *Biologia* (Pakistan), 64, 37–43.

Metzner, H. (1999) Die Springspinnen (Araneae, Salticidae) Griechenlands. *Andrias,* 14, 1–279.

Peng, X.J. (2020) *Fauna Sinica, Invertebrata 53, Arachnida: Araneae: Salticidae*. Science Press, Beijing. 612 p.

Prószyński, J. (1984) Atlas rysunków diagnostycznych mniej znanych Salticidae (Araneae). *Zeszyty Naukowe Wyższej Szkoły Rolniczo-Pedagogicznej w Siedlcach*, 2, 1–177.

Prószyński, J. (2018) Review of genera *Evarcha* and *Nigorella*, with comments on *Emertonius*, *Padilothorax* [sic], *Stagetillus*, and description of five new genera and two new species (Araneae: Salticidae). *Ecologica Montenegrina*, 16, 130–179. https://doi.org/10.37828/em.2018.16.12

Roewer, C.F. (1955) K*atalog der Araneae von 1758 bis 1940, bzw. 1954. 2. Band, Abt. a (Lycosaeformia, Dionycha [excl. Salticiformia]). 2. Band, Abt. b (Salticiformia, Cribellata) (Synonyma-Verzeichnis, Gesamtindex)*. Institut Royal des Sciences Naturelles de Belgique, Bruxelles. 1751 p.

Sajid, M., Caleb, J.T.D., Zahid, M. & Ahmad, S. (2020) New data on the jumping spider fauna of Pakistan (Araneae: Salticidae). *Arthropoda Selecta*, 29, 330–333. https://doi.org/10.15298/arthsel.29.3.05

Thorell, T. (1895) *Descriptive catalogue of the spiders of Burma, based upon the collection made by Eugene W. Oates and preserved in the British Museum*. Printed by order of the Trustees, London. 406 p. https://doi.org/10.5962/bhl.title.17492

Trivedi, V., Caleb, J.T.D., & Sherwood, D. (2023) Rediscovery of *Evarcha pulchella* (Thorell 1895) (Araneae: Salticidae), with the first record for India. *Acta Arachnologica*, 72, 129–133. https://doi.org/10.2476/asjaa.72.129

WSC (2024) World Spider Catalog. Version 24.5. Natural History Museum Bern, online at http://wsc.nmbe.ch [Accessed October 10, 2024] https://doi.org/10.24436/2

اولین گزارش عنکبوت (Araneae: Salticidae) *Evarcha pulchella* (Thorell, 1895) از پاکستان به همراه توصیف جنس ماده

پیر اسمت علی

گروه جانورشناسی، دانشگاه زنان سوابی، سوابی، پاکستان.

* پست الکترونیک نویسنده مسئول مکـاتبه: *pirasmat85@gmail.com*

| **تاریخ دریـافت:** ۲۶ اردیبهشت ۱۴۰۳ | **تاریخ پذیرش:** ۱۳ مهر ۱۴۰۳ | **تاریخ انتشار:** در حال چاپ |

چکیـده: عنکبوت جهنده *Evarcha pulchella* (Thorell, 1895) (Salticidae) بر اساس نمونه‌هایی از مراتع و تپه‌های خشک نیمه‌گرمسیری منطقهٔ هندوکش، برای اولین بار در کشور پاکستان ثبت شد. جنس ماده این گونه نیز برای اولین بار توصیف شد. تصاویر و ترسیم خصوصیات افتراقی این گونه ارایه شد.

واژگـان کلیدی: هندوکش، عنکبوت‌های جهنده، توصیف مورفولوژیک، تاکسونومی