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Redescriptions of two poorly known species of *Zodariellum* Andreeva & Tystshenko, 1968 (Araneae, Zodariidae) from Uzbekistan

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ABSTRACT. Two poorly known species of the zodariid spider genus *Zodariellum* Andreeva & Tyshchenko, 1968 – *Z. spasskyi* (Charitonov, 1946) and *Z. zebra* (Charitonov, 1946) – are redescribed based on type specimens from eastern Uzbekistan. Additionally, a lectotype is designated for the former species.

Key words: Aranei, Central Asia, lectotype, Zodariinae, *Z. spasskyi*, *Z. zebra*

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INTRODUCTION

Zodariellum Andreeva & Tyshchenko, 1968 is a genus of the spider family Zodariidae Thorell, 1881, currently comprising 21 species distributed from the Volga River's delta to eastern China (WSC, 2023). The genus has recently undergone significant taxonomic revisions by Zamani & Marusik (2021, 2022). The highest diversity of *Zodariellum* occurs in Central Asia, from where 15 species are currently known (WSC, 2023). Five species have been documented in Uzbekistan, two of which, *Z. spasskyi* (Charitonov, 1946) and *Z. zebra* (Charitonov, 1946), are poorly illustrated. Both species are known from female specimens collected in the same locality in Aman-Kutap in eastern Uzbekistan (Charitonov, 1946, 1969), with *Z. spasskyi* also known by a doubtful record from Kazakhstan (Logunov & Gromov, 2012). Recently, we had the opportunity to examine the type material of these two species, which are redescribed and illustrated in this paper.

MATERIAL AND METHODS

Photographs of specimens and their epigynes were obtained using an Olympus OMD EM-10 digital camera, with a Panasonic Lumix H-H025 25 mm f/1.7 lens mounted on a Zeiss microscope. Digital images of different focal planes were stacked with Adobe Photoshop CS6. Leg segments were

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measured on the dorsal side. Measurements of legs are listed as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are given in millimetres. **Abbreviations:** ALE – anterior lateral eye, AME – anterior median eye, Fe – femur, LT – lectotype, PLE – posterior lateral eye, PLT – paralectotype, PME – posterior median eye. **Depository: PSU** – Perm State University, Perm, Russia (S.L. Esyunin).

RESULTS

Taxonomic hierarchy

Class Arachnida Lamarck, 1801

Order Araneae Clerck, 1757

Family Zodariidae Thorell, 1881

Genus *Zodariellum* Andreeva & Tystshenko, 1968

Zodariellum Andreeva & Tystshenko, 1968:688.
Zodariellum: Marusik & Koponen, 2001:40 (removed from the synonymy of *Zodarion*). — Zamani & Marusik, 2021:184. — Zamani & Marusik, 2022:162.

Type species. *Zodariellum surprisum* Andreeva & Tyshchenko, 1968 from Tajikistan, by original designation.

Diagnosis, description and composition. See Zamani & Marusik (2022).

***Zodariellum spasskyi* (Charitonov, 1946) (Figs 1–2, 4–5)**

Zodarion spasskyi Charitonov, 1946:22, fig. 11 (♀).
Zodarion spasskyi: Charitonov, 1969:72.
Zodariellum spasskyi: Zamani & Marusik, 2022:175.

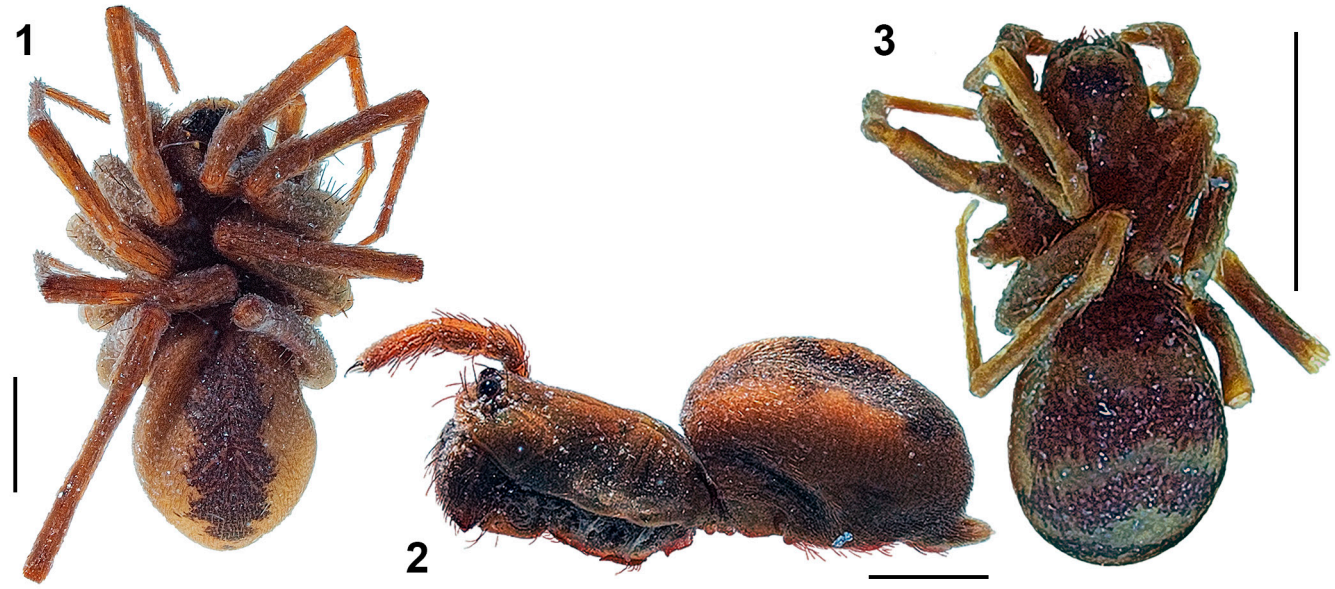
Type material. **Lectotype** ♀ (PSU, **designated here**), UZBEKISTAN: *Samarqand Region*: Urgut District, near 39°18'N 66°55'E, 1200–1900 m; labelled as "*Zodarion spasskyi* n.sp. D. Charitonov det., Aman-Kutap [mountain area], 40 km SE from Samarqand, 23.V.1942, D.M. Fedotov". **Paralectotype**: 1♀ (PSU; epigyne mounted on a slide), collected with the lectotype.

Diagnosis. *Zodariellum spasskyi* differs from all its congeners by its unique abdominal pattern: light coloured with a wide dark median band spanning from the anterior to the posterior part (*vs.* a longitudinal dark band absent in other species). The shape of its epigyne is very similar to that of *Z. nenilini* (Eskov, 1995) and is almost indistinguishable. Nevertheless, there are slight differences in the anterior hood (cf. Figs 4, 8).

Description. *Female*. Habitus as in Figs 1–2. Total length 4.85 (LT), 5.01 (PLT). Carapace length 2.25 (LT), 2.38 (PLT), width 1.05 (LT), 1.70 (PLT). Eye sizes (LT): ALE: 0.10, AME: 0.14, PLE: 0.10, PME: 0.08. Coloration (*sensu* Charitonov, 1946, 1969): body light yellow; ocular region black; sternum with narrow reddish brown margin; abdomen dorsally with longitudinal dark brown band. Measurements of legs (LT): I: 7.08 (1.90, 0.68, 1.50, 1.93, 1.08), II: 7.18 (1.90, 0.75, 1.38, 2.05, 1.10), III: 7.23 (2.00, 0.75, 1.38, 2.13, 0.98), IV: 9.65 (2.63, 0.83, 2.25, 2.75, 1.20). Epigyne as in Figs 4–5; plate twice wider than long, with triangular anterior hood, its anterior margin forming angle of 120°; receptacles oval, spaced by ca. 4 times their width; copulatory ducts long, twisted 5 times around their axes, converging and forming angle of ca. 105°.

Male. Unknown.

Distribution. Confidently known only from the type locality in eastern Uzbekistan. Although Logunov & Gromov (2012) included this species in their list of spiders of Kazakhstan, the original record for *Z. spasskyi* in this country could not be located. According to Zamani & Marusik (2022), it is likely that this record belongs to a different species. Considering that the epigyne of *Z. spasskyi* is almost indistinguishable from that of *Z. nenilini*, it is possible that their record in fact refers to the latter species.



Figures 1–3. Habitus of *Zodariellum* species. **1.** *Z. spasskyi*, lectotype; **2.** *Z. spasskyi*, paralectotype, dorsal and lateral views; **3.** *Z. zebra*, dorsal view. Scale bars = 1.0 mm.

Zodariellum zebra (Charitonov, 1946) (Figs 3, 6–7)

Zodarion zebra Charitonov, 1946:21, fig. 10 (♀).
Zodarion zebra: Charitonov, 1969:71.
Zodariellum zebra: Zamani & Marusik, 2022:176.

Type material. **Holotype** ♀ (PSU; epigyne mounted on a slide), UZBEKISTAN: *Samarqand Region*: Urgut District, near 39°18'N 66°55'E, 1200–1900 m; labelled as "*Zodarion zebra* n.sp., D. Charitonov det., Aman-Kutap [mountain area], 40 km SE from Samarqand, 21.V.1942, D.M. Fedotov".

Diagnosis. The epigyne of *Z. zebra* is very similar to that of *Z. proszynskii* (Nenilin & Fet, 1895). However, it can be distinguished by its large and well-delimited bell-shaped atrium and wider coils of copulatory ducts. Additionally, the anterior part of the copulatory ducts are contiguous (cf. Figs 6, 9). Regarding abdominal patterning, *Z. zebra* is similar to *Z. testaceofasciatum* (Spassky, 1941). Nevertheless, it can be distinguished from the latter by its smaller size (carapace length of 1.05, *vs*. 1.7).

Description. *Female*. Habitus as in Fig. 3. Total length 2.45. Carapace length 1.05, width 0.43. Eye sizes: ALE: 0.07, AME: 0.08, PLE: 0.07, PME: 0.07. Coloration (*sensu* Charitonov 1946, 1969): carapace yellow, with a brown transverse spot on border of cephalic and thoracic parts; eye field black; abdomen light yellow, with 3 transverse brown bands in anterior half and a herringbone-shaped spot in posterior half. Measurements of legs (unlisted segments missing): I: 2.55 (0.67, 0.27, 0.53, 0.60, 0.48), II: 2.56 (0.70, 0.31, 0.49, 0.63, 0.43), Fe III: 0.77, IV: 3.57 (1.01, 0.35, 0.74, 0.92, 0.55). Epigyne as in Figs 6–7; plate ca. 1.9 times wider than long; with large, bell-shaped fovea having well delimited margins, ca. as long as wide; receptacles round, spaced by ca. 4 diameters; copulatory ducts converging, touching anteriorly, and forming an angle of 100°; each copulatory duct forming 4 complete coils.

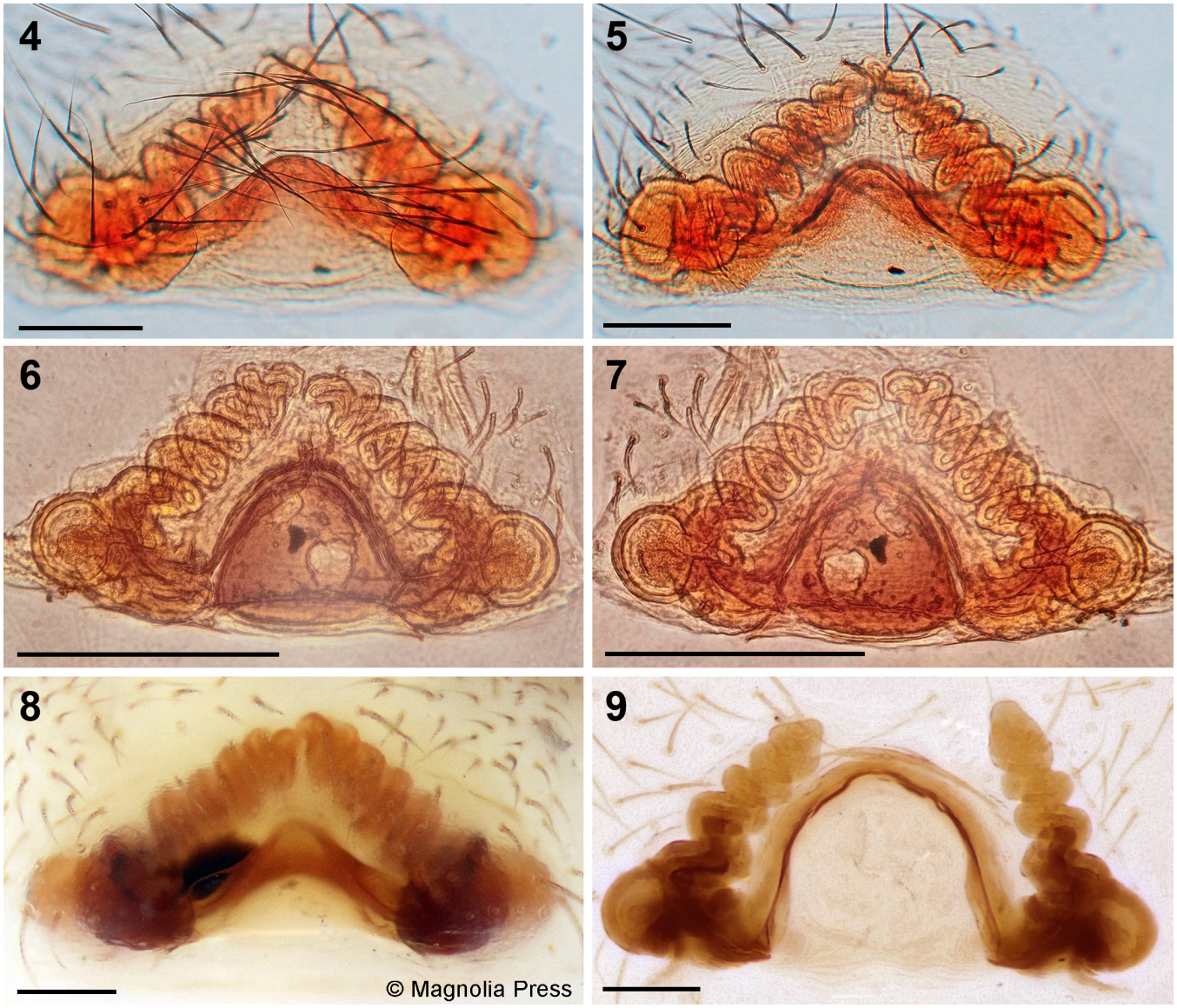
Male. Unknown.

Comments. According to Zamani & Marusik (2022), there is a possibility that *Z. zebra* is a junior synonym of *Z. testaceofasciatum*. The latter species is known solely by a female and a juvenile specimen from western Tajikistan, with no accompanying illustrations of the epigyne (Spassky, 1941). These two species exhibit a similar abdominal pattern, and their respective type localities are approximately 200 km apart. *Zodariellum turanicum* Zamani & Marusik, 2022 is another species with a similar abdominal pattern, known only by the male holotype. Its type locality is situated in Lebap, Turkmenistan, about 155 km away from the type locality of *Z. zebra* and approximately 300 km from the type locality of

Z. testaceofasciatum. Until the discovery of the currently unknown sexes of these species and a redescription of the female of *Z. testaceofasciatum* is provided, the three species can tentatively be differentiated from one another by their size and coloration (Table 1).

Table 1. Comparison of some of the somatic characters for three species of *Zodariellum*.

	Z. zebra (♀)	*Z. testaceofasciatum* (♀)	*Z. turanicum* (♂)
Length of carapace	1.05	1.7	1.6
Coloration (carapace)	yellow	black-brown	yellow
Coloration (abdomen; dorsal, ventral)	yellow, yellow	Chestnut brown, fawn brown	dark marrow, light beige
Transverse stripes	wide	wide	narrow



Figures 4–9. Epigynes of *Zodariellum* species. **4–5.** *Z. spasskyi* (paralectotype); **6–7.** *Z. zebra*; **8.** *Z. nenilini*; **9.** *Z. proszynskii*, ventral (4, 6, 8, 9) and dorsal (5, 7) views. Fig. 8 reproduced from Zamani & Marusik (2022) with permission from copyright holder; Fig. 9 reproduced from Zamani & Marusik (2021). Scale bars = 0.1 mm.

DISCUSSION

Two species of *Zodariellum* were redescribed in this paper based on type specimens from eastern Uzbekistan. Among the 15 species of *Zodariellum* known from Central Asia, four species – *Z. spasskyi*, *Z. tadzhikum* (Andreeva & Tystshenko, 1968), *Z. testaceofasciatum*, and *Z. zebra* – are known only by females, while three species – *Z. surprisum*, *Z. turanicum*, and *Z. turkmenicum* (Zamani & Marusik, 2022) – are known only by males. The illustrations provided in this work and previous studies (e.g., Zamani & Marusik, 2022) reveal that the shape of the epigyne is quite homogenous among different species of this genus, despite potentially distinct differences in coloration and male palp. Amongst the Central Asian species, the epigynes of most species are inadequately illustrated. As a result, it is likely that the discovery of previously unknown sexes and the redescriptions of poorly known species will lead to the synonymization of some of these species.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution in the paper as follows: S.E. & A.Z.: Conceptualization; S.E.: Microscopic photography; S.E., A.Z. & Y.M.: Writing – original draft; A.Z.: Writing – review and editing. The authors read and approved the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the Arachnological Collection of the Perm State University, Russia and are available from the curator, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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توصیف مجدد دو گونه کم‌شناخته شده از جنس *Zodariellum* Andreeva & Tystshenko, 1968 (Araneae, Zodariidae) از ازبکستان

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چکیده: دو گونه کم شناخته شده از عنکبوت‌های خانوادهٔ Zodariidae متعلق به جنس *Zodariellum* Andreeva & Tystshenko, 1968 شامل *Z. spasskyi* (Charitonov, 1946) و *Z. zebra* (Charitonov, 1946) بر اساس نمونه‌های تایپ از شرق ازبکستان مجدداً توصیف شدند. همچنین، برای گونه نخست نمونه لکتوتایپ تعیین شد.

واژگان کلیدی: Aranei، آسیای مرکزی، لکتوتایپ، Zodariinae، *Z. spasskyi*، *Z. zebra*