BioOne COMPLETE

A new species of Phyxioschema (Araneae: Dipluridae) from Iran

Authors: Schwendinger, Peter J., and Zamani, Alireza

Source: Revue suisse de Zoologie, 125(2) : 283-289

Published By: Muséum d'histoire naturelle, Genève

URL: https://doi.org/10.5281/zenodo.1414225

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://bioone.org/journals/Revue-suisse-de-Zoologie on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Revue suisse de Zoologie (September 2018) 125(2): 283-289 ISSN 0035-418

A new species of *Phyxioschema* (Araneae: Dipluridae) from Iran

Peter J. Schwendinger[1] & Alireza Zamani[2]

[1] *Muséum d'histoire naturelle, C. P. 6404, CH-1211 Genève 6, Switzerland.*
E-mail: peter.schwendinger@ville-ge.ch
[2] *School of Biology, College of Sciences, University of Tehran, Tehran, Iran.*
E-mail: zamani.alireza5@gmail.com

Abstract: *Phyxioschema gedrosia* sp. nov. is described from a single male collected in Sistan & Baluchistan Province, southeastern Iran. The new species appears most closely related to *P. roxana* Schwendinger & Zonstein, 2011 found in Uzbekistan and Tajikistan, from which it clearly differs by the shape of tibia II (angle between article and its ventral spur acute instead of rounded; apical megaspines of spur situated one behind the other instead of side by side) and of metatarsus II (proventral keel subquadrangular instead of triangular). The presence of two additional *Phyxioschema* populations in southwestern and central Iran is mentioned and the currently known distribution of the genus in Iran is mapped.

Keywords: Taxonomy - spiders - Mygalomorphae - Baluchistan.

INTRODUCTION

The genus *Phyxioschema* was previously known from six species in tropical Thailand (Raven & Schwendinger, 1989; Schwendinger, 2009) and from two species in arid Central Asia (Schwendinger & Zonstein, 2011). One of the latter, *P. raddei* Simon, 1889, has been known for almost 120 years and is widely distributed in the region (confirmed records from Iran, Turkmenistan, Tajikistan, Kazakhstan; possibly also present in Afghanistan, Kyrgyzstan and Pakistan; Schwendinger & Zonstein, 2011: 38; Zamani, 2016; Zamani *et al*., 2018). The other Central Asian species, *P. roxana* Schwendinger & Zonstein, 2011, was described more recently and is so far only known from eight upland localities in Uzbekistan and Tajikistan (Schwendinger & Zonstein, 2011: 43-44). Here we describe a new species from southeastern Iran and report on two *Phyxioschema* populations in southwestern and central Iran, all of which lie far outside the previously known range of the genus (Schwendinger & Zonstein, 2011: fig. 1).

MATERIAL AND METHODS

External morphology was studied and drawn with a Zeiss SV11 stereomicroscope. Images were taken at several focal planes by using a digital camera mounted on a Leica MZ APO stereomicroscope and then assembled with the AutoMontage® system.

Body measurements were taken with a stereomicroscope and are given in mm. The total body length includes the chelicerae but not the spinnerets. Lengths of leg and palp articles were measured on the dorsal side, and lengths of spinneret articles on the ventral side, from midpoint of distal margin to midpoint of proximal margin. Leg and palp measurements are given as follows: total length (length of femur + length of patella + length of tibia + length of metatarsus [absent on palp] + length of tarsus). Measurements of eye diameters and distances between eyes are based on the dimensions of the whole eye lenses, not just their light-coloured central portions. The curvature of the eye rows refers to an imaginary line running through the centre of each eye in the same row. Leg formula is from shortest to longest leg. The number of spines and their position (dorsal, ventral, pro- and retrolateral) on the leg articles of both sides are given. Spine counts do not include the spinules on femora I and II and on tibia II. Counts taken from both sides of the body (e.g., left and right tarsi I) are separated by a forward slash. The terminology follows Raven (1981), Schwendinger (2009) and Schwendinger & Zonstein (2011).

Abbreviations: AME, ALE, PME, PLE = anterior (posterior) median (lateral) eyes; d = dorsal; MOQ = median ocular quadrangle; p = prolateral; r = retrolateral; v = ventral.

All specimens examined are deposited in the Muséum d'histoire naturelle, Genève, Switzerland (MHNG).

Manuscript accepted 23.07.2018
DOI: 10.5281/zenodo.1414225

Downloaded From: https://bioone.org/journals/Revue-suisse-de-Zoologie on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

TAXONOMY

Phyxioschema gedrosia sp. nov.

Figs 1-4

Material: Male holotype; Iran, Sistan & Baluchistan Province, Bashagard Mts, Haboudan Village, 26°37'2.8"N, 60°23'38"E; 17.XI.2017; leg. A. Zamani.

Etymology: The specific epithet, a name in apposition, is the ancient Greek name of modern Baluchistan (= Baluchestan).

Diagnosis: Medium-sized species with fairly stout legs (Fig. 1). Different from all other *Phyxioschema* species by one apical megaspine on ventral spur of tibia II situated behind the other (Fig. 3G-H, I-J), not beside it. Distinguished from the Central Asian *P. raddei* and *P. roxana* by angle between tibia II and its ventral spur being much narrower and acute rather than rounded (Figs 2G, 3I-J cf. Schwendinger & Zonstein, 2011: figs 2D-E and 6E-F); proventral keel on metatarsus II prominent and subquadrangular (Figs 2G, 3L-O) instead of low and rounded (as in *P. raddei*; Schwendinger & Zonstein, 2011: figs 2D, 3L-P) or prominent and subtriangular (as in *P. roxana*; Schwendinger & Zonstein, 2011: figs 6E, 7K-N).

Description: *Male:* Colour in alcohol: Carapace (Figs 1, 2A) uniformly light brown; eye mound black. Palpal coxae light brown, prolateral zone only indistinctly lighter than rest of ventral side (Fig. 2B). Labium with cream-coloured anterior half and light reddish brown posterior half (Fig. 2B). Sternum mostly light brown; margin, fused anterior pair of sigilla (forming postlabial depression) and separated three pairs of sigilla light reddish brown (Fig. 2B). Legs (including ventral side of coxae) mostly light brown, their ventral side slightly lighter than dorsal side; entire dorsal side of tibia I, patches at bases of spines on ventral side of tibia I (Fig. 2F), entire metatarsus I and most of tarsus I (except for pseudosegmentation) distinctly darker; small retrodorsal-distal patch, large prodorsal-prolateral-distal patch (extending back to band of hooked spinules) and entire ventral spur of tibia II, and proximal third



Fig. 1. *Phyxioschema gedrosia* sp. nov., habitus of live male holotype (photo by A. Zamani).

Downloaded From: https://bioone.org/journals/Revue-suisse-de-Zoologie on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

of metatarsus II dark reddish brown (Fig. 2G); no light longitudinal dorsal stripes on patellae discernible, indistinct ones present on tibiae and metatarsi I. All membranes uniformly cream-coloured. Opisthosoma mostly light greyish brown, without pattern (Figs 1, 2C); ventral side of posterior lateral spinnerets greyish brown, mottled with light spots.

Body 11.7 long. Carapace (Fig. 2A) 4.5 long, 3.9 wide, oval, almost flat, quite densely covered with fine, relatively long, adpressed grey hairs (most straight, few slightly curved or wavy); few stronger bristles on and in front of eye mound, two bristles in front of pitlike fovea and several bristles on posterolateral corners of carapace. Eyes (Fig. 3A) on low mound; eye group 0.41 long, anterior eye row distinctly procurved, 0.71 wide, posterior eye row straight, 0.78 wide. Eye diameters and interdistances: AME 0.14, ALE 0.24, PME 0.16, PLE 0.21; AME-AME 0.09, AME-ALE 0.06, PME-PME 0.28, PME-PLE 0.04. MOQ 0.28 long, 0.33 wide anteriorly, 0.55 posteriorly.

Chelicerae weak, grooves with 9/11 prolateral teeth and about 30 tiny medioproximal denticles. Palpal coxae (Fig. 2B) 1.1 long, 0.7 wide; prolateral-distal lobe indistinct, with indistinct serrula on ridge. Labium (Fig. 2B) 0.3 long, 0.7 wide, anterior edge distinctly setose, followed by pallid zone without setae; posterior part pigmented, with few setae. Sternum (Fig. 2B) 2.3 long, 1.9 wide, cordate, with distinctly sunken post-labial sigilla (medially fused with each other and with labiosternal suture) and three pairs of indistinct marginal sigilla.

Palps (Fig. 3B-C). Measurements: total length 4.4 (1.8 + 0.7 + 1.2 + 0.7). Spination: tibia r1 (very long); tarsus p1, r1 (much shorter). 8+8 trichobothria in two rows on tibiae, 10 trichobothria in an irregular row on tarsi. Palpal organ with a narrow kidney-shaped subtegulum, a much

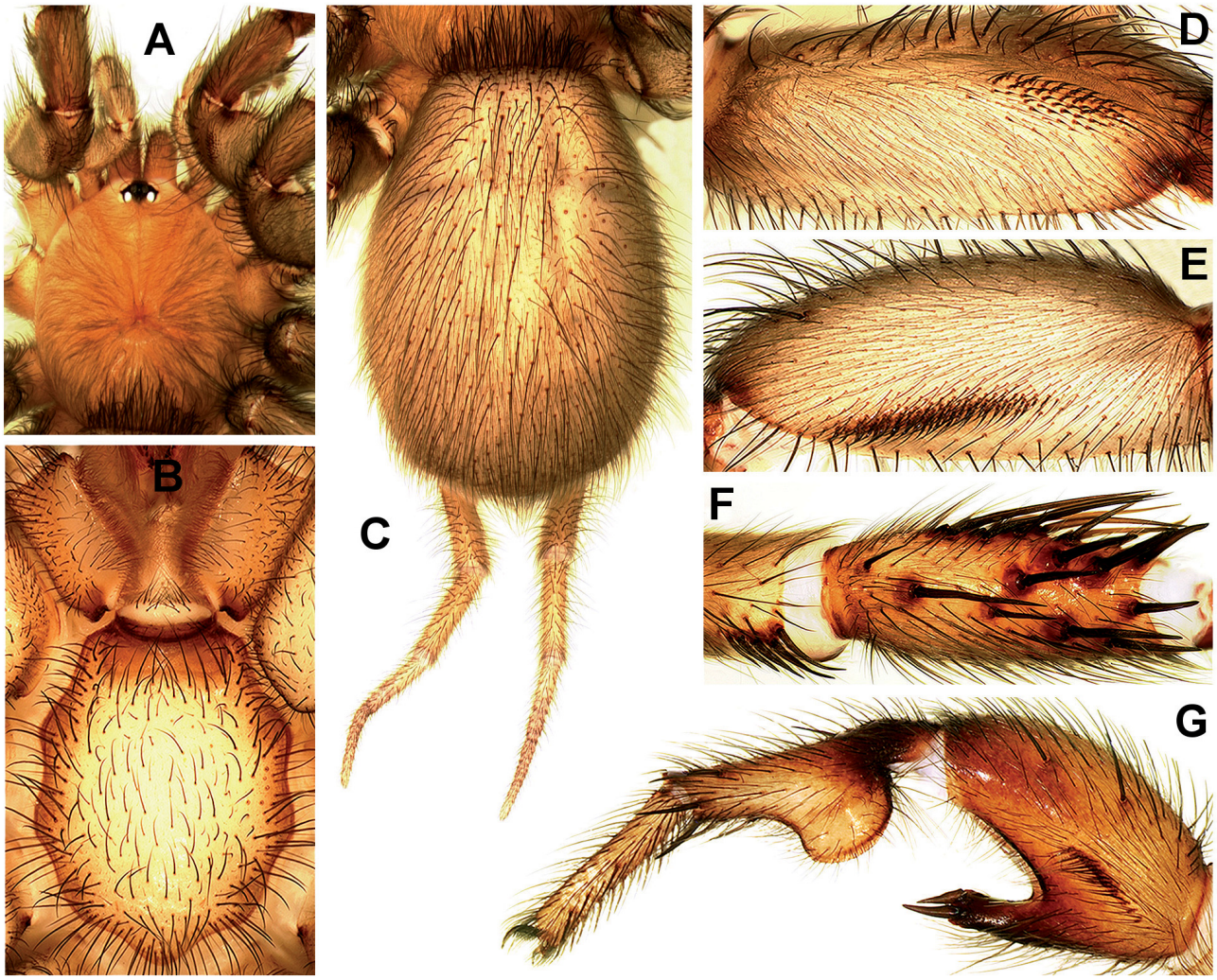


Fig. 2A-G. *Phyxioschema gedrosia* sp. nov., male holotype. (A) Prosoma, dorsal view. (B) Palpal coxae, labium and sternum, ventral view. (C) Opisthosoma, dorsal view. (D) Right femur I, retrodorsal view. (E) Right femur II, prolateral view. (F) Left tibia I, ventral view. (G) Right tibia, metatarsus and tarsus II, prolateral view.

Downloaded From: https://bioone.org/journals/Revue-suisse-de-Zoologie on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

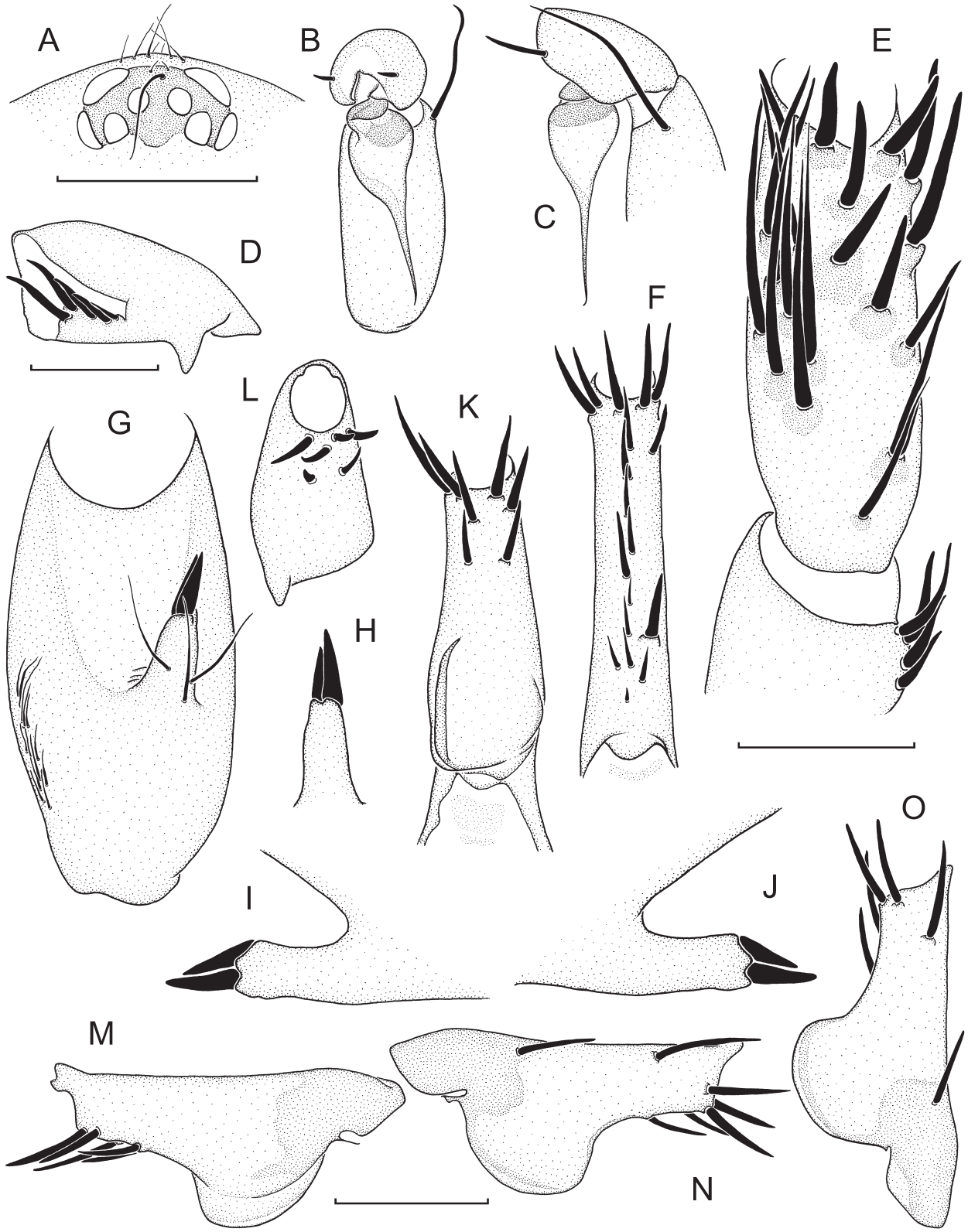


Fig. 3A-O. *Phyxioschema gedrosia* sp. nov., male holotype. (A) Eye region, dorsal view. (B) Left palp, ventral view. (C) Left palpal tarsus and palpal organ, retrolateral view. (D) Left patella I, retrolateral and slightly retroventral view. (E) Left tibia I and distal part of patella I, ventral view. (F) Left metatarsus I, ventral view. (G) Left tibia II, ventral view. (H) Right tibial spur, ventral and slightly retrolateral view. (I) Left tibial spur, retrolateral view. (J) Right tibial spur, retrolateral view. (K) Left metatarsus II, ventral view. (L) Same, distal view. (M) Same, retrolateral view. (N) Same, prolateral view. (O) Right metatarsus II, prolateral view. All scale lines 1.0 mm; A-C, D, E-L and M-O to same scale.

Downloaded From: https://bioone.org/journals/Revue-suisse-de-Zoologie on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

wider, asymmetrically pyriform tegulum and a quite long (about as long as tegulum), almost straight embolus tapering to a very slightly curved tip.

Legs 2134. Leg I 11.5 long (3.4 + 2.0 + 2.4 + 2.3 + 1.4); leg II 11.3 long (3.3 + 1.8 + 2.4 + 2.2 + 1.6); leg III 12.1 long (3.4 + 1.7 + 2.2 + 3.1 + 1.7); leg IV 15.2 long (3.8 + 2.1 + 3.1 + 4.2 + 2.0). Tibia I 1.06 wide, tibia II 1.30, tibiae III and IV 0.71 each. All tarsi pseudosegmented and densely armed with spines. Metatarsal preening combs absent. Leg I: metatarsus with one proximoventral spine stronger than nearby ones (similar to distoventral spines; on left side more pronounced than on right side; Fig. 3F); tibia distinctly incrassate (150% of tibiae III or IV width), ventrally flattened in some areas (mostly in distal half), carrying ventral megaspines with bases surrounded by darker pigment (Figs 2F, 3E); patella with a curved row of 4/5 spines retroventrally (the distal ones longer and curved, the proximal ones shorter and slightly sigmoid), without triangular projection on retrolateral margin (Fig. 3D); distal part of femur with relatively short and wide band of hooked spinules retrodorsally (Fig. 2D). Leg II: proximal part of metatarsus with two widely separated keels (Fig. 3K-L): the proventral one large, almost quadrangular in prolateral view and with a sharp, very prominent ventral edge (Figs 2G, 3L-O), the retroventral keel indistinct, much less elevated and with an angular but not elevated ventral edge (Fig. 3L-M); tibia strongly incrassate (180% of tibiae III and IV width; Figs 2G, 3G), band of elongate spinules on prolateral side straight, slightly inclined from longitudinal axis of tibia, reaching beyond height of distal side of ventral spur (Fig. 2G); ventral spur of tibia apically tapering in ventral view (Fig. 3G) and only indistinctly widened in lateral view (Figs 2G, 3I-J), its apex not bilobed and carrying two megaspines, one situated behind the other (not side by side as in all other *Phyxioschema* spp.); dorsal megaspine shorter and more inclined from axis of tibial spur than ventral one (Figs 2G, 3G-J); band of hooked spinules prolaterally on femur II (Fig. 2E) much longer and slightly narrower than corresponding band on femur I (Fig. 2D).

Spination: I: patella p1, v4/5; tibia p1/2, v20; metatarsus v13/17; tarsus v13. II: patella p2; tibia p2, v2 megaspines; metatarsus p2, v7; tarsus v17. III: patella p2/3, r1; tibia d2, p2, r2, v5; metatarsus d5, p3, r1, v10/11; tarsus v12. IV: patella p2, r1; tibia d2, p2, r2, v6; metatarsus d3/4, p2, r1, v9/10; tarsus v9.

Trichobothria: 9-10+9-10 in two rows on tibiae; 10-12 in a straight row on metatarsi; about 9-10 in a straight row on tarsi. Paired claws with 10-12 teeth in sigmoid row; unpaired claw with 6-7 quite long, sessile teeth.

Opisthosoma 6.3 long, 4.4 wide; covered with fine adpressed hairs (mostly in posterior part) interspersed with fewer fine dark hairs and long dark bristles with orange-brown sockets (Fig. 2C). Posterior median spinnerets 0.6 long; posterior lateral spinnerets 5.9 long (proximal article 1.7, median article 1.7, pseudosegmented distal article 2.5).

Female: Unknown.

Relationships and taxonomic status: Due to the stouter and more spiny legs with incrassate tibiae I and II and a ventrally partly flattened tibia I, *P. gedrosia* sp. nov. clearly belongs to the Central Asian species group which also includes *P. raddei* and *P. roxana*. Judging from the distally narrow ventral spur on tibia II and from the strongly projecting and sharp proventral keel on metatarsus II, *P. gedrosia* sp. nov. appears most closely related to *P. roxana*. The characteristic and strongly autapomorphic ventral coupling spur of tibia II with its apical megaspines situated one behind the other (Figs 2G, 3G-J) is not completely unparalleled. In *P. raddei* the retrolateral-apical lobe of the coupling spur is slightly bent dorsad, and consequently the retrolateral megaspine is situated slightly more dorsally than the prolateral one (see Schwendinger & Zonstein, 2011: figs 2C-E, 3G), though not behind it as in *P. gedrosia* sp. nov. This may be an indication for a close relationship between *P. raddei* and *P. gedrosia* sp. nov., as is the presence of an enlarged ventral spine in the proximal part of metatarsus I. However, other taxonomic characters (narrow apex of ventral spur of tibia II; presence of only two keels on metatarsus II, the proventral one large and very prominent) rather supports a closer relationship between *P. roxana* and *P. gedrosia* sp. nov. The female of the new species is unknown and characters of the vulva thus cannot be evaluated for phylogenetic relationship, but in view of the very close resemblance of the vulvae in *P. raddei* and *P. roxana* we do not expect to find much useful information to this respect once the missing female is discovered.

Due to the still unresolved taxonomic status of *Afghanothele lindbergi* Roewer, 1960 and *A. striatipes* Roewer, 1960 and due to the continuous inaccessibility of their type localities in Afghanistan, it is possible that *P. gedrosia* sp. nov. as well as *P. roxana* will be synonymised with one of these two nominal species in the future. A further new *Phyxioschema* locality recently discovered by the second author in southwestern Iran (so far only females available) may belong to any of the currently known species, but we would not be surprised if it represents yet another undescribed species. The *Phyxioschema* diversity in Central Asia is possibly much underestimated, as it was in Thailand (Raven & Schwendinger, 1989; Schwendinger, 2009). More spider sampling in Central Asia is desirable but unfortunately this has long been (and still is) difficult due to political and sectarian conflicts.

Distribution, habitat and phenology: The holotype of *P. gedrosia* sp. nov. was collected from its web using meal worms as bait. The type locality in southeastern Iran (Fig. 4, locality 6) lies in the driest region of Central Asia. The habitat is a deserted mountainous

Downloaded From: https://bioone.org/journals/Revue-suisse-de-Zoologie on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use



Fig. 4. Localities of *Phyxioschema* spp. in Iran. Circle: *P. raddei*; star: *P. gedrosia* sp. nov.; square: *Phyxioschema* sp. White symbols refer to literature records, red symbols refer to our new data. 1 = Golestan Prov., Shahpasand; 2 = North Khorasan Prov., near Dasht (Schwendinger & Zonstein, 2011); 3 = North Khorasan Prov., Assadi, 30 km S of Bojnoord, 37°14'N, 57°15'E (Zamani *et al*., 2017); 4 = Khuzestan Prov., Izeh, Takht-e Kashan; 5 = Kerman Prov., 20 km north of Ravar; 6 = Sistan & Baluchistan Prov., Bashagard Mts, Haboudan Village.

area, with the main vegetation consisting of the palm *Nannorrhops ritchiana*.

The male holotype was collected immature in November 2017 and moulted to maturity in February 2018. This is earlier than in *P. roxana* (May to June) and in *P. raddei* (May to July).

Phyxioschema sp.

Fig. 4

Material examined: 3 females and 1 juvenile; Iran, Khuzestan Province, Izeh, Takht-e Kashan, 31°50'N, 49°52'E, 15.III.2018; leg. A. Zamani. – 1 large juvenile male (probably subadult; ex coll. A. Senglet); Iran, Kerman Province, 20 km north of Ravar, 31°26'N, 56°51'E, 1150 m alt.; 14.IV.1974; leg. J. Garzoni.

Remarks: The available material consists only of females and juveniles, which show no clearly distinctive features. The vulva of the largest female from Khuzestan is slightly different from those of *P. raddei* and *P. roxana* females illustrated in the literature (Schwendinger & Zonstein, 2011: figs 4A-H, 5A-H, 8A-H), and therefore it is quite possible that the specimens from southwestern Iran belong to another new species. However, until an adult male from this population becomes available, this will remain an open question. The juvenile male from Kerman may be conspecific with the holotype of *P. gedrosia* sp. nov., but that also requires confirmation by collecting adult males at the same locality.

Downloaded From: https://bioone.org/journals/Revue-suisse-de-Zoologie on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

ACKNOWLEDGEMENTS

We are grateful to Sergei L. Zonstein for reviewing the manuscript. Iman Foroozandeh informed AZ about the presence of *Phyxioschema* in southwestern Iran, Alireza Naderi, Parham Beyhaghi and Soheyl Sami assisted during the collection of spiders. John Hollier checked the English text, Christina Lehmann-Graber inked the line drawings of PJS, Florence Marteau scanned them and Lionel Monod (all four MHNG) helped to format the figure files.

REFERENCES

Raven R.J. 1981. The mygalomorph spider genera *Phyxioschaema* Simon and *Stenygrocercus* Simon (Dipluridae: Ischnothelinae). *Bulletin of the British Arachnological Society* 5(5): 225-231.

Raven R.J., Schwendinger P.J. 1989. On a new *Phyxioschema* (Araneae, Mygalomorphae, Dipluridae) from Thailand and its biology. *Bulletin of the British Arachnological Society* 8(2): 55-60.

Roewer C.F. 1960. Solifugen und Opilioniden, Araneae Orthognathae, Haplogynae und Entelegynae (Contribution à l'étude de la faune d'Afghanistan 23). *Göteborgs Kungliga Vetenskaps- och Vitterhets-Samhälles Handlingar* (ser. B) 8(7): 1-53.

Schwendinger P. J. 2009. A taxonomic revision of the genus *Phyxioschema* (Araneae, Dipluridae), I: species from Thailand. *Zootaxa* 2126: 1-40.

Schwendinger P. J., Zonstein S. L. 2011. A taxonomic revision of the genus *Phyxioschema* (Araneae, Dipluridae), II: species from Central Asia. *Zootaxa* 2815: 28-48.

Simon E. 1889. Arachnidae transcaspicae ab ill. Dr. G. Radde, Dr. A. Walter et A. Conchin inventae (annis 1886-1887). *Verhandlungen der kaiserlich-königlich zoologisch-botanischen Gesellschaft in Wien* 39: 373-386.

Zamani A. 2016. The field guide of spiders and scorpions of Iran. *Iranshenasi, Tehran*, 360 pp. [in Farsi]

Zamani A., Mirshamsi O., Dolejš P., Marusik Y.M., Esyunin S.L., Hula V., Ponel P. 2017. New data on the spider fauna of Iran (Arachnida: Araneae), Part IV. *Acta Arachnologica* 66(2): 55-71.

Zamani A., Mirshamsi O., Marusik Y.M., Moradmand M. 2018. The checklist of the spiders of Iran (Arachnida: Araneae). Version 2018. Available at http://spiders.ir/ (accessed VII.2018).

Downloaded From: https://bioone.org/journals/Revue-suisse-de-Zoologie on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use