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## Research article

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# Two new species of the spider genus *Pholcus* Walckenaer, 1805 (Araneae, Pholcidae) from Tajikistan, with the first description of female *Pholcus sidorenkoi* Dunin, 1994

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**Abstract.** Two new species of the genus *Pholcus* Walckenaer, 1805 are described from Tajikistan: *Pholcus saidovi* Yao & Li sp. nov. ( $\mathcal{J}^{\mathbb{Q}}$ ) and *P. shuguanensis* Yao & Li sp. nov. ( $\mathcal{J}$ ). The female of *P. sidorenkoi* Dunin, 1994 is reported for the first time. All belong to the *P. nenjukovi* species group.

Key words. Biodiversity, morphology, pholcid, Pholcinae, taxonomy.

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## Introduction

The spider family Pholcidae C.L. Koch, 1850 currently contains 80 genera and 1514 species (Huber *et al.* 2016a; World Spider Catalog 2016). Members of the family are among the most diverse and abundant web-building spiders throughout the world. The family contains five subfamilies: Ninetinae Simon, 1890, Arteminae Simon, 1893, Modisiminae Simon, 1893, Smeringopinae Simon, 1893 and Pholcinae C.L. Koch, 1850 (Huber 2011a; Dimitrov *et al.* 2013). *Pholcus* Walckenaer, 1805 is the

largest genus of Pholcinae and Pholcidae, with 337 described species belonging to 32 species groups and mainly distributed in the Old World (Huber 2011b; Huber *et al.* 2016b; World Spider Catalog 2016). The genus is poorly studied in Tajikistan. Currently, only three species have been recorded: *P. nenjukovi* Spassky, 1936 and *P. sidorenkoi* Dunin, 1994 from the *P. nenjukovi* species group and *P. arkit* Huber, 2011 from the *P. ponticus* species group (Huber 2011b; World Spider Catalog 2016). In this paper, two species of *Pholcus* are newly described and the female of *P. sidorenkoi* is reported for the first time. All belong to the *P. nenjukovi* species group and were collected in Tajikistan.

## Material and methods

Specimens were examined and measured with a LEICA M205 C stereo microscope. Images were taken with an Olympus C7070 wide zoom digital camera (7.1 megapixels) mounted on an Olympus SZX12 dissecting microscope, they were mounted using Helicon Focus 6.6.1 image stacking software (Khmelik *et al.* 2006). Male and female genitalia were examined and illustrated after dissection. External genitalia were previously treated in a 10% warm solution of potassium hydroxide (KOH). The left male pedipalps were studied. All specimens were preserved in 75% ethanol. All measurements are given in millimeters. Leg measurements are shown as: total length (femur + patella + tibia + metatarsus + tarsus). Leg podomeres were measured on their dorsal side. The distribution map was generated with ArcView GIS 3.2. All material studied is deposited in the Institute of Zoology, Chinese Academy of Sciences (IZCAS) in Beijing, China (curator: Jun Chen).

Terminology and taxonomic descriptions follow Huber (2011b). The following abbreviations are used in the descriptions:

- ALE = anterior lateral eye
- AME = anterior median eye
- PME = posterior median eye
- L/d = length/diameter

## Results

Class Arachnida Cuvier, 1812 Order Araneae Clerck, 1757 Family Pholcidae C.L. Koch, 1850 Subfamily Pholcinae C.L. Koch, 1850

Genus Pholcus Walckenaer, 1805

*Pholcus* Walckenaer, 1805: 80. Type species: *Aranea phalangioides* Fuesslin, 1775 [= *Pholcus phalangioides* (Fuesslin, 1775)].

Pholcus – Huber 2011b: 124.

#### **Diagnosis and description**

See Huber (2011b).

#### Pholcus nenjukovi species group

#### **Diagnosis and description**

See Huber (2011b).

## *Pholcus saidovi* Yao & Li sp. nov. <u>urn:lsid:zoobank.org:act:87CC0DD5-96AF-4F51-8564-24062E686958</u> Figs 1–2, 7

## Diagnosis

This species resembles *P. nenjukovi* Spassky, 1936 (see Spassky 1936: 40, figs 4–6; Huber 2011b: 340, figs 1537, 1637–1641, 1659–1660) in having similar male chelicerae (Fig. 2D), appendix (Fig. 2C), and female external genitalia (Fig. 2A), but can be distinguished by the presence of a large, sclerotized retrolateral apophysis on the uncus (arrow in Fig. 2C), by a large, blunt dorsal apophysis distally on the procursus (arrow in Fig. 1D), and by distinctly visible oval pore plates (Fig. 2B). This species also resembles *P. arsacius* Senglet, 2008 (see Senglet 2008: 363, figs 40–46, 55–56) in having similar male chelicerae (Fig. 2D), procursus (Fig. 1A–D), appendix (Fig. 2C), and vulva (Fig. 2B), but can be distinguished by the presence of a large, sclerotized retrolateral apophysis on the uncus (arrow in Fig. 2C), and vulva (Fig. 2B), but can be distinguished by the presence of a large, sclerotized retrolateral apophysis on the uncus (arrow in Fig. 2C), and vulva (Fig. 2B), but can be distinguished by the presence of a large, sclerotized retrolateral apophysis on the uncus (arrow in Fig. 2C), and vulva (Fig. 2B), but can be distinguished by the presence of a large, sclerotized retrolateral apophysis on the uncus (arrow in Fig. 2C) and more elongate female external genitalia (Fig. 2A).

## Etymology

The specific epithet is a patronym in honor of Professor Abdusattor Saidov for his contribution on the collaborative research in Tajikistan; noun (name) in genitive case.

## Material examined

## Holotype

TAJIKISTAN: ♂, Tavildara Region, Hoga Pulod Village, 38°43.307′ N, 70°26.907′ E, 1679 m, 19 Jul. 2014, Z. Yao leg.

## Paratypes

TAJIKISTAN: 1  $\mathcal{J}$ , 2  $\mathcal{Q}\mathcal{Q}$ , same data as holotype.

## Description

#### Male (holotype)

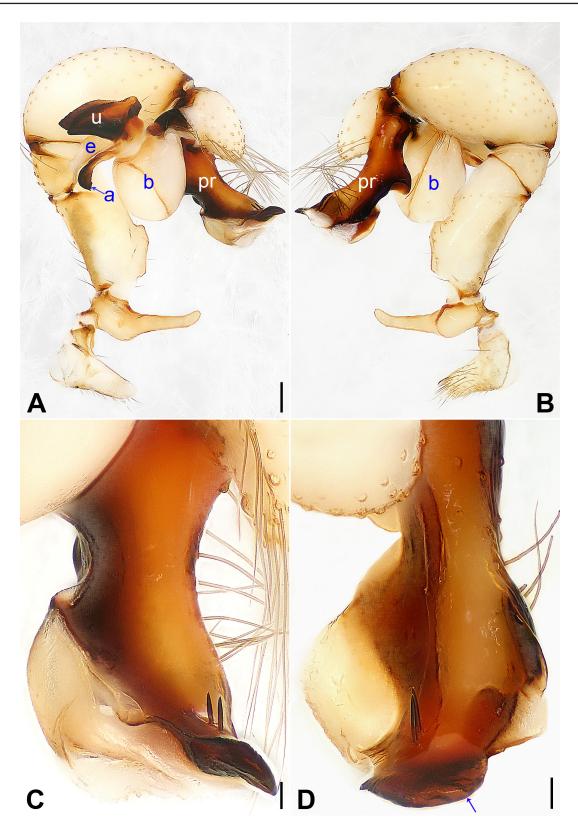
MEASUREMENTS. Total length 4.42 (4.81 with clypeus), carapace 1.38 long, 1.73 wide, opisthosoma 3.04 long, 1.30 wide. Leg I: 35.65 (9.17 + 0.69 + 9.68 + 14.23 + 1.88), leg II: 24.08 (6.73 + 0.69 + 6.22 + 9.29 + 1.15), leg III: 17.53 (5.13 + 0.60 + 4.36 + 6.54 + 0.90), leg IV: 22.72 (6.86 + 0.60 + 5.83 + 8.27 + 1.16); tibia I L/d: 69. Distance PME-PME 0.31; diameter PME 0.10; distance PME-ALE 0.03; distance AME-AME 0.04; diameter AME 0.08.

COLOR. Carapace yellowish, with brown radiating marks extending to ocular area; ocular area yellowish, with brown median stripe; sternum brown. Legs yellowish, distal parts of femora and tibiae whitish, darker rings absent. Opisthosoma yellowish.

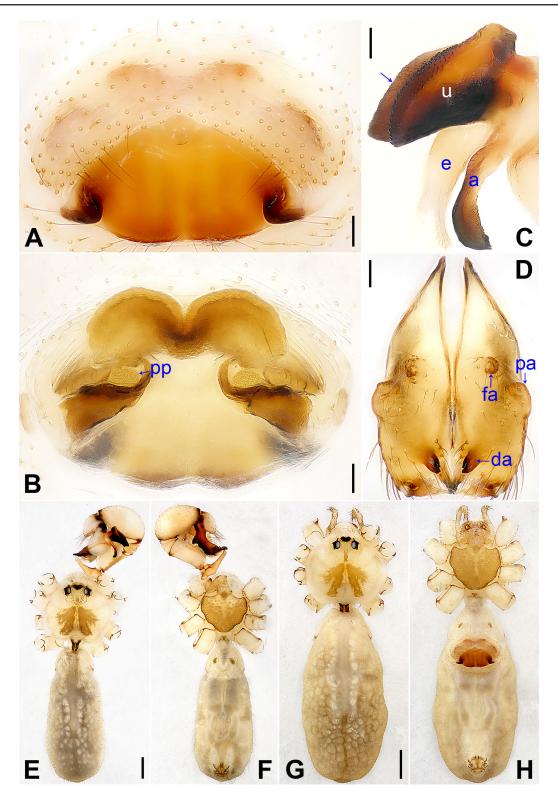
BODY. Habitus as in Fig. 2E–F. Ocular area elevated, without eye-stalks. Thoracic furrow absent. Sternum wider than long (1.04/0.78).

CHELICERAE. As in Fig. 2D, with pair of large proximo-lateral apophyses, pair of distal apophyses provided with two teeth each, and pair of frontal apophyses.

PEDIPALPS. As in Fig. 1A–B; trochanter with ventral apophysis; femur with dorsal apophysis proximally and distinct ventral modification; procursus simple proximally but complex distally, with two prolaterodorsal spines; uncus distinctively 'doubled', each with scaly edge; appendix curved, with scales; embolus weakly sclerotized, with some transparent projections distally.



**Fig. 1.** *Pholcus saidovi* Yao & Li sp. nov., holotype,  $\mathcal{F}$ . **A–B**. Pedipalp (A. Prolateral view. B. Retrolateral view). **C–D**. Distal part of procursus (C. Prolateral view. D. Dorsal view, arrow points at blunt dorsal apophysis distally). Abbreviations: a = appendix; b = bulb; e = embolus; pr = procursus; u = uncus. Scale bars: A-B = 0.20 mm; C-D = 0.05 mm.



**Fig. 2.** *Pholcus saidovi* Yao & Li sp. nov., holotype,  $\bigcirc$  (C–F) and paratype,  $\bigcirc$  (A–B, G–H). **A**. External genitalia, ventral view. **B**. Vulva, dorsal view. **C**. Bulbal apophyses, prolateral view, arrow points at large, sclerotized retrolateral apophysis on uncus. **D**. Chelicerae, frontal view. **E–H**. Habitus (E, G. Dorsal view. F, H. Ventral view). Abbreviations: a = appendix; da = distal apophysis; e = embolus; fa = frontal apophysis; pa = proximo-lateral apophysis; pp = pore plate; u = uncus. Scale bars: A–D = 0.10 mm; E–H = 0.50 mm.

LEGS. Retrolateral trichobothrium of tibia I at 8%; legs with short vertical setae on tibiae, metatarsi and tarsi; without spines and curved setae; tarsus I with approximately 10 distinct pseudosegments.

#### Female

Similar to male, habitus as in Fig. 2G–H. Total length 5.03 (5.64 with clypeus), carapace 1.43 long, 1.72 wide, opisthosoma 3.60 long, 1.78 wide; tibia I: 8.53; tibia I L/d: 53. Distance PME–PME 0.25; diameter PME 0.10; distance PME–ALE 0.03; distance AME–AME 0.06; diameter AME 0.08. Sternum wider than long (1.04/0.86). External genitalia (Fig. 2A) with knob. Vulva (Fig. 2B) with sclerotized anterior arch and two oval pore plates.

## Variation

Tibia I in one male paratype: 10.06. Tibia I in another female paratype: 8.33.

#### **Natural history**

The species was found on the underside of rocks.

## Distribution

Tajikistan (Tavildara, type locality; Fig. 7).

## *Pholcus shuguanensis* Yao & Li sp. nov. <u>urn:lsid:zoobank.org:act:E8EBA85C-203B-4E3C-8053-D2F0CF69643C</u> Figs 3–4, 7

#### Diagnosis

This species can be distinguished from all congeners in the *P. nenjukovi* species group by medially wide male chelicerae (Fig. 4B), by a narrow and distally blunt uncus provided with a large proximal apophysis (Fig. 4A), by a stick-shaped appendix (Fig. 4A), and by the presence of a large, prolateral membranous area distally on the procursus (arrow in Fig. 3C).

#### Etymology

The specific epithet refers to the type locality; adjective.

## Material examined

## Holotype

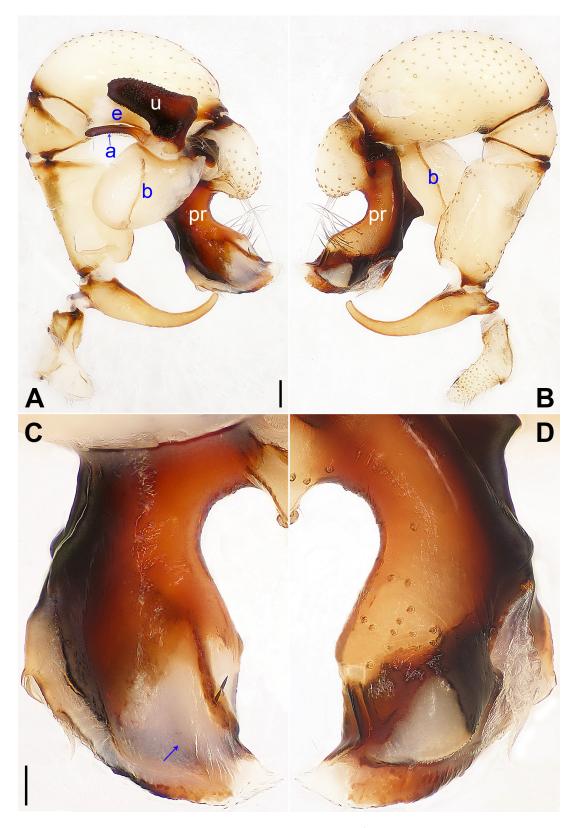
TAJIKISTAN: ♂, Gorno-Badakhshan Region, Shuguan District, Tem Village, 37°33.402′ N, 71°30.564′ E, 2061 m, 13 Aug. 2015, K. Meng leg.

## Description

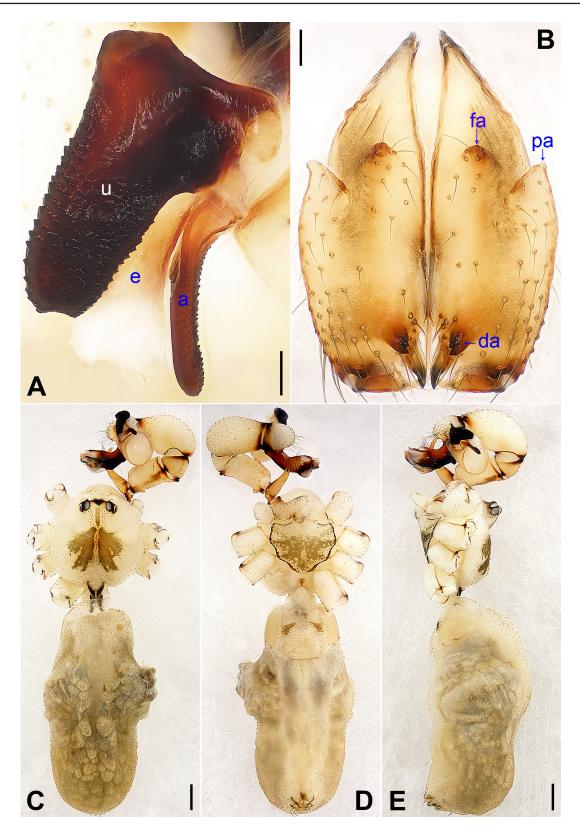
## Male (holotype)

MEASUREMENTS. Total length 5.62 (5.93 with clypeus), carapace 1.65 long, 1.80 wide, opisthosoma 3.97 long, 1.74 wide. Leg I and leg IV missing, leg II: 29.23 (8.08 + 0.81 + 7.63 + 11.41 + 1.30), leg III: 21.67 (6.41 + 0.72 + 5.51 + 8.01 + 1.02). Distance PME–PME 0.32; diameter PME 0.13; distance PME–ALE 0.04; distance AME–AME 0.06; diameter AME 0.07.

COLOR. Carapace yellowish, with brown radiating marks extending to ocular area; ocular area yellowish, with brown median stripe; sternum yellowish, with brown marks. Legs yellowish, proximal parts and distal parts of femora and tibiae whitish, darker rings absent. Opisthosoma yellowish.



**Fig. 3.** *Pholcus shuguanensis* Yao & Li sp. nov., holotype,  $\mathcal{O}$ . **A–B**. Pedipalp (A. Prolateral view. B. Retrolateral view). **C–D**. Distal part of procursus (C. Prolateral view, arrow points at large, prolateral membranous area distally. D. Retrolateral view). Abbreviations: a = appendix; b = bulb; e = embolus; pr = procursus; u = uncus. Scale bars: A-B = 0.20 mm; C-D = 0.10 mm.



**Fig. 4.** *Pholcus shuguanensis* Yao & Li sp. nov., holotype,  $\mathcal{O}$ . **A.** Bulbal apophyses, prolateral view. **B.** Chelicerae, frontal view. **C–E.** Habitus (C. Dorsal view. D. Ventral view. E. Lateral view). Abbreviations: a = appendix; da = distal apophysis; e = embolus; fa = frontal apophysis; pa = proximolateral apophysis; u = uncus. Scale bars: A–B = 0.10 mm; C–E = 0.50 mm.

BODY. Habitus as in Fig. 4C–E. Ocular area elevated, without eye-stalks. Thoracic furrow absent. Sternum wider than long (1.22/1.14).

CHELICERAE. As in Fig. 4B, with pair of proximo-lateral apophyses, pair of distal apophyses provided with two teeth each, and pair of frontal apophyses.

PEDIPALPS. As in Fig. 3A–B; trochanter with long and curved ventral apophysis; femur with dorsal apophysis proximally; procursus simple proximally but complex distally, with two prolatero-dorsal spines; uncus with scales; appendix stick-shaped, with scales; embolus weakly sclerotized, with some transparent projections distally.

LEGS. Legs with short vertical setae on tibiae, metatarsi and tarsi; without spines and curved setae.

Female

Unknown.

## **Natural history**

The species was found on the underside of rocks.

## Distribution

Tajikistan (Gorno-Badakhshan, type locality; Fig. 7).

Pholcus sidorenkoi Dunin, 1994 Figs 5–7

Pholcus sidorenkoi Dunin, 1994: 136, figs 1-7.

Pholcus sidorenkoi - Huber 2011b: 340, figs 1538, 1642-1644.

## Diagnosis

This species resembles *P. cophenius* Senglet, 2008 (see Senglet 2008: 365, figs 57–65) in having similar male chelicerae (Fig. 6D), appendix (Fig. 6C), and female external genitalia (Fig. 6A), but can be distinguished by slightly thicker male pedipalpal trochanter (Fig. 5A–B), by absence of distal sclerites on less curved procursus (Fig. 5C–D), by more elongate uncus (Fig. 6C) (Huber 2011b), and by more elongate vulval pore plates (Fig. 6B).

## Material examined

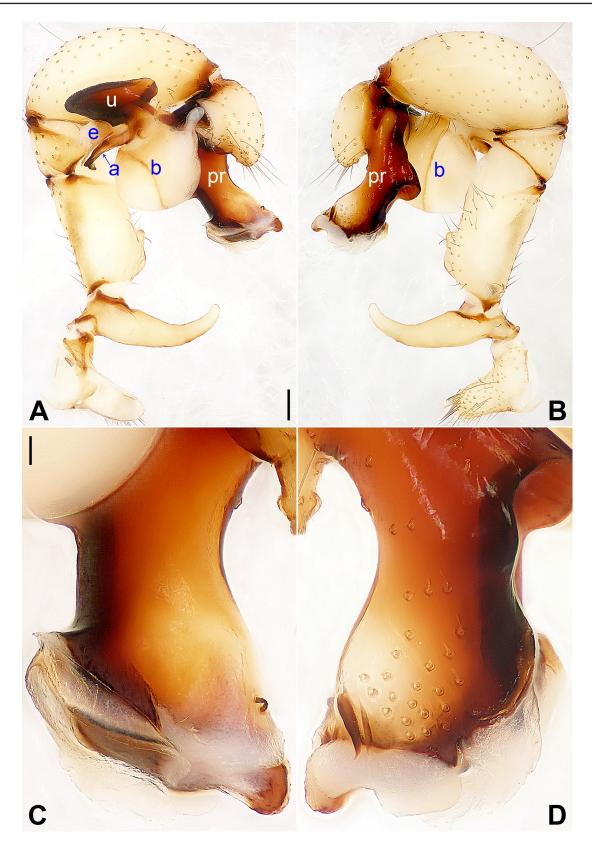
TAJIKISTAN: 1 ♂, 1 ♀, Vazob Region, Hazora Village, 39°03.362′ N, 68°52.273′ E, 2584 m, 21 Jul. 2014, Z. Yao leg.

#### Description

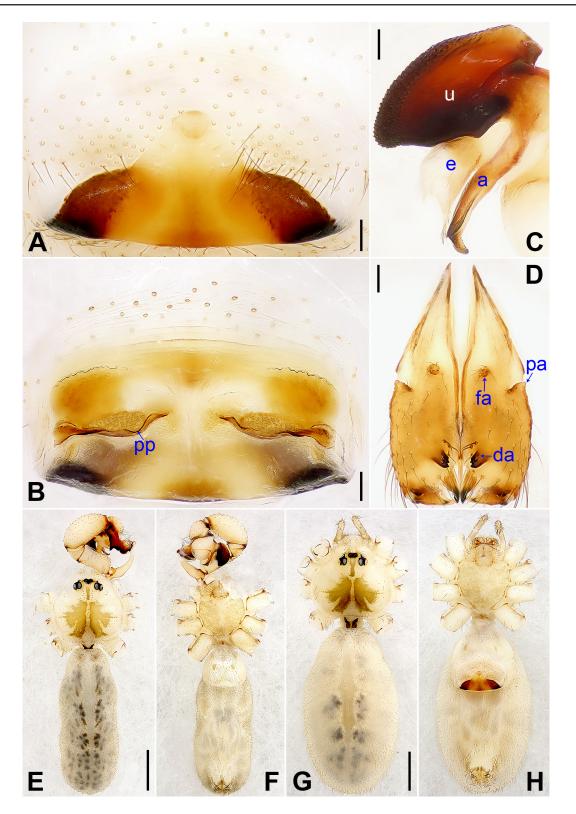
#### Male

MEASUREMENTS. Total length 5.26 (5.71 with clypeus), carapace 1.66 long, 1.88 wide, opisthosoma 3.60 long, 1.48 wide. Leg I: 40.16 (10.13 + 0.66 + 10.78 + 16.35 + 2.24), leg II: 29.28 (7.95 + 0.80 + 7.69 + 11.54 + 1.30), leg III: 18.05 (6.54 + 0.72 + 5.64 + 5.15 + 1.06), leg IV: 28.91 (8.40 + 0.77 + 7.56 + 10.90 + 1.28); tibia I L/d: 64. Distance PME–PME 0.34; diameter PME 0.11; distance PME–ALE 0.06; distance AME–AME 0.05; diameter AME 0.08.

COLOR. Carapace yellowish, with brown radiating marks extending to ocular area; ocular area yellowish, with brown median stripe; sternum yellowish, with brownish marks. Legs yellowish, femora (subdistally)



**Fig. 5.** *Pholcus sidorenkoi* Dunin, 1994,  $\Diamond$ . **A–B**. Pedipalp (A. Prolateral view. B. Retrolateral view). **C–D**. Distal part of procursus (C. Prolateral view. D. Retrolateral view). Abbreviations: a = appendix; b = bulb; e = embolus; pr = procursus; u = uncus. Scale bars: A–B = 0.20 mm; C–D = 0.05 mm.



DONG T. et al., Two new species of Pholcus from Tajikistan

**Fig. 6.** *Pholcus sidorenkoi* Dunin, 1994,  $\mathcal{J}$  (C–F) and  $\mathcal{Q}$  (A–B, G–H). **A**. External genitalia, ventral view. **B**. Vulva, dorsal view. **C**. Bulbal apophyses, prolateral view. **D**. Chelicerae, frontal view. **E–H**. abitus (E, G. Dorsal view. F, H. Ventral view). Abbreviations: a = appendix; da = distal apophysis; e = embolus; fa = frontal apophysis; pa = proximo-lateral apophysis; pp = pore plate; u = uncus. Scale bars: A–D = 0.10 mm; E–H = 1.00 mm.

and tibiae (subdistally) with darker rings. Opisthosoma yellowish, with brown spots dorsally and laterally.

BODY. Habitus as in Fig. 6E-F. Ocular area elevated, without eye-stalks. Thoracic furrow absent. Sternum wider than long (1.17/0.98).

CHELICERAE. As in Fig. 6D, with pair of proximo-lateral apophyses, pair of distal apophyses provided with two teeth each, and pair of frontal apophyses.

PEDIPALPS. As in Fig. 5A–B; trochanter with long curved ventral apophysis; femur with small dorsal apophysis proximally and small ventral modification; procursus simple proximally but complex distally, with two prolatero-dorsal spines; uncus with scaly edge; appendix with scales distally and flat prolateral process; embolus short and weakly sclerotized, with some transparent projections distally. Retrolateral trichobothrium of tibia I at 6%; legs with short vertical setae on tibiae, metatarsi and tarsi; without spines and curved setae; tarsus I with approximately 5 distinct pseudosegments.

## Female

Similar to male, habitus as in Fig. 6G–H. Total length 5.10 (5.64 with clypeus), carapace 1.50 long, 1.80 wide, opisthosoma 3.60 long, 2.03 wide; tibia I: 8.97; tibia I L/d: 56. Distance PME–PME 0.27; diameter PME 0.10; distance PME–ALE 0.05; distance AME–AME 0.05; diameter AME 0.08. Sternum wider than long (1.14/1.00). External genitalia (Fig. 6A) with knob. Vulva (Fig. 6B) with sclerotized anterior arch and two nearly elliptic pore plates.

## Natural history

The species was found in an old house.

## Distribution

Russia (Samara, see Huber 2011b: 339, fig. 1636) and Tajikistan (Dushanbe, see Huber 2011b: 339, fig. 1636; Vazob, Fig. 7).

## Discussion

The genus *Pholcus* is highly diverse, and currently contains 337 described species (World Spider Catalog 2016). The most important contributor is Bernhard A. Huber, who divided Pholcus into 32 species groups and described/revised a large number of species (Huber 2011b; Huber et al. 2016a, 2016b). Nevertheless, the survey of *Pholcus* is very uneven. For example, most taxonomic contributions on Pholcus published in the past five years focused on Southeast Asia and China (e.g., Yao & Li 2012, 2013; Peng & Zhang 2013; Yao et al. 2015; Huber et al. 2016a, 2016b), which account for nearly one fifth and one third of the species, respectively. In contrast, species from Central Asia are poorly studied. So far, only 24 species have been recorded, including the two new species described in this paper. These species are rather diverse and belong to five different species groups. Furthermore, among these five species groups, the *P. nenjukovi* species group is the most diverse, including eight of the 24 species. They were mostly collected on rock walls in caves or under rocks, at elevations between 1100 and 2600 meters (Senglet 2008; Huber 2011b). Current distribution records are restricted to Tajikistan, Iran and Afghanistan. Based on the high diversity of the P. nenjukovi species group from these three countries, as well as the similar landforms and habitats in neighboring countries, such as Pakistan, Turkmenistan, Uzbekistan and Kyrgyzstan, we strongly believe that only a small fraction of the P. nenjukovi species group has been described and a large amount of diversity is yet to be discovered.

## Acknowledgments

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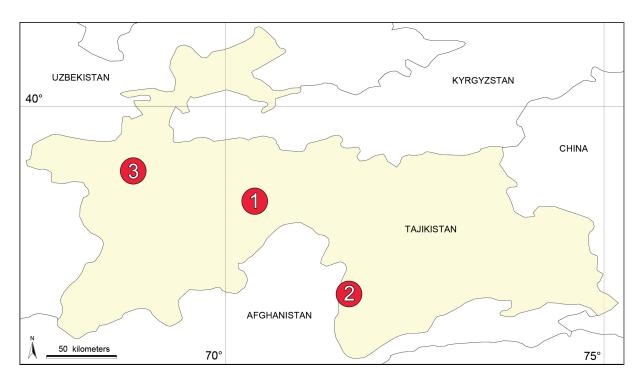


Fig. 7. New distribution records of *Pholcus* species from Tajikistan. ① *Pholcus saidovi* Yao & Li sp. nov. ② *P. shuguanensis* Yao & Li sp. nov. ③ *P. sidorenkoi* Dunin, 1994.

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