JOURNAL OF NATURAL HISTORY
2023, VOL. 57, NOS. 37–40, 1693–1709
https://doi.org/10.1080/00222933.2023.2272356

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New species and records of *Oecobius* Lucas, 1846 (Araneae: Oecobiidae) from Iran and Azerbaijan

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ABSTRACT

New data on the oecobiid spiders of the genus *Oecobius* Lucas, 1846 occurring in Iran and Azerbaijan are provided. Five species are described as new to science: *O. dariusi* **sp. n.** (♀; Alborz and Tehran – northern Iran), *O. melanocephalus* **sp. n.** (♀; Lorestan, Razavi Khorasan, Semnan, and Tehran – south-western, northern and north-eastern Iran; hitherto described as the female of *O. ferdowsii* Mirshamsi, Zamani and Marusik, 2017), *O. naxuanus* **sp. n.** (♂; Nakhchivan – western Azerbaijan), *O. pasargadae* **sp. n.** (♂♀; Fars – south-central Iran), and *O. zagros* **sp. n.** (♂; Kermanshah – western Iran). Furthermore, *O. navus* Blackwall, 1859 is reported in Iran for the first time, and new distribution records are provided for *O. putus* O. Pickard-Cambridge, 1876 and *O. nadiae* (Spassky, 1936).

http://www.zoobank.org/urn:lsid:zoobank.org:pub:98E34233-D62C-4443-A963-6F1DFB6183DF

ARTICLE HISTORY
Received 22 August 2023
Accepted 12 October 2023

KEYWORDS
Aranei; Caucasus; fauna; Middle East; taxonomy

Introduction

Oecobius Lucas, 1846, the largest genus of the spider family Oecobiidae, has an almost global distribution and currently comprises 90 species, as well as one fossil species from Dominican amber (Dunlop *et al*. 2020; WSC 2023). Although it is the most species-rich oecobiid genus, no species-group divisions have been proposed for it, except for the species found in the Canary Archipelago, where the genus has the highest species diversity – 41 species (Wunderlich 1987). These species were categorised into three species groups, with just one, the *navus* group, being non-endemic to the archipelago. Although a worldwide revision of this genus has never been undertaken, it is relatively well studied within specific regions, particularly in the Nearctic (Shear 1970), as well as areas in the Mediterranean region, e.g. the Canary Islands, Madeira, and the East Mediterranean (Wunderlich 1987, 1992, 1995). Wunderlich has described 49 species (WSC 2023), which accounts for over half of the presently recognised species of *Oecobius*. Only four of his described species have been later synonymised. Besides the

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Published online 17 Nov 2023

Mediterranean region, only Iran has been the subject of several publications dealing with *Oecobius* (e.g. Zamani *et al*. 2017; Zamani and Marusik 2018; Zamani and Bosselaers 2020), resulting in six species currently known from this country (including two endemics). However, the fauna of the adjacent Caucasus remains relatively poorly studied, with only five species currently known from the region, all of which have wide distributions (Otto 2022). In this paper, we contribute to the knowledge of the diversity of this genus in Iran and the Caucasus by providing descriptions of five new species and recording one species that is new to Iran.

Material and methods

Photographs were obtained using an Olympus Camedia E-520 camera attached to an Olympus SZX16 stereomicroscope, and a JEOL JSM-5200 scanning electron microscope at the Zoological Museum of the University of Turku. Digital images of different focal planes were stacked with Helicon Focus™ 8.1.1. Illustrations of the vulvae were made after digesting tissues off in a 10% potassium hydroxide (KOH) aqueous solution. Leg segments were measured on the dorsal side. Measurements of legs are listed as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are given in millimetres. The map (Figure 9) was prepared using SimpleMappr (Shorthouse 2010).

Abbreviations: Eyes: ALE – anterior lateral eye, **AME** – anterior median eye, **PLE** – posterior lateral eye, **PME** – posterior median eye.
Depositories: AZMI – Agricultural Zoology Museum of Iran, Tehran, Iran (A. Khaleghizadeh); **MHNG** – Muséum d'histoire naturelle, Genève, Switzerland (L. Monod); **MMUE** – Manchester Museum of the University of Manchester, United Kingdom (D.V. Logunov); **ZMFUM** – Zoological Museum of the Ferdowsi University of Mashhad, Iran (O. Mirshamsi); **ZMMU** – Zoological Museum of the Moscow State University, Russia (K.G. Mikhailov); **ZMUT** – Zoological Museum of the University of Turku, Finland (V. Vahtera); **ZUCT** – Zoological Collection of the University of Tehran, Iran.

Family OECOBIIDAE Blackwall, 1862
Genus *Oecobius* Lucas, 1846

Type species
Oecobius domesticus Lucas, 1846, a junior synonym of *O. cellariorum* (Dugès, 1836).

Oecobius dariusi **sp. n.**
(Figures 1A, 2A–E)

Type material
Holotype ♀ (ZMMU), IRAN: Tehran Province: 80 km E of Tehran, Damavand, Aroo Vil., 35.666667°N, 52.45°E, 15 June 2000 (Y.M. Marusik). Paratypes: 3♀ (ZMMU), 3♀ (MMUE), same data as for the holotype; 2♀ (ZMUT), Alborz Province: Sardor area, 10 km N of Karaj, 30.833333°N, 51.083333°E, 13 June 2000 (Y.M. Marusik).

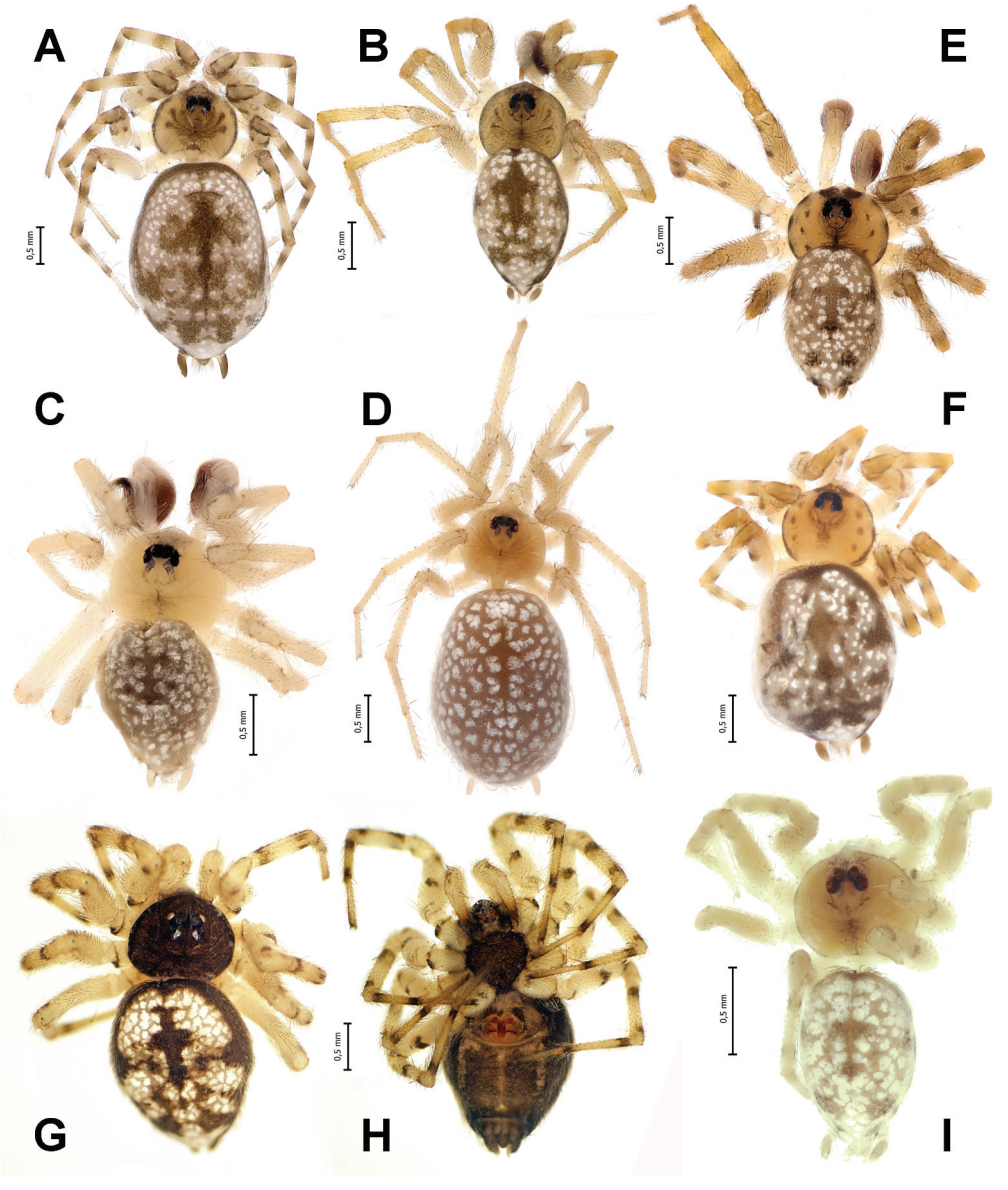

Figure 1. Habitus of *Oecobius dariusi* **sp. n.** (A), *O. naxuanus* **sp. n.** (B), *O. pasargadae* **sp. n.** (C, D), *O. navus* (E, F), *O. melanocephalus* **sp. n.** (G, H) and *O. zagros* **sp. n.** (I), in dorsal (A–G, I) and ventral (H) views. A, D, F, G, H, females; B, C, E, I, males. G, H reproduced from Zamani *et al*. (2017). Scale bars = 0.5 mm.

Etymology

This species is named after Darius I, who is more commonly known as Darius the Great. He was the third King of Kings of the Achaemenid Empire and reigned from 522 BCE until his death in 486 BCE. During his rule, the empire reached its territorial peak.

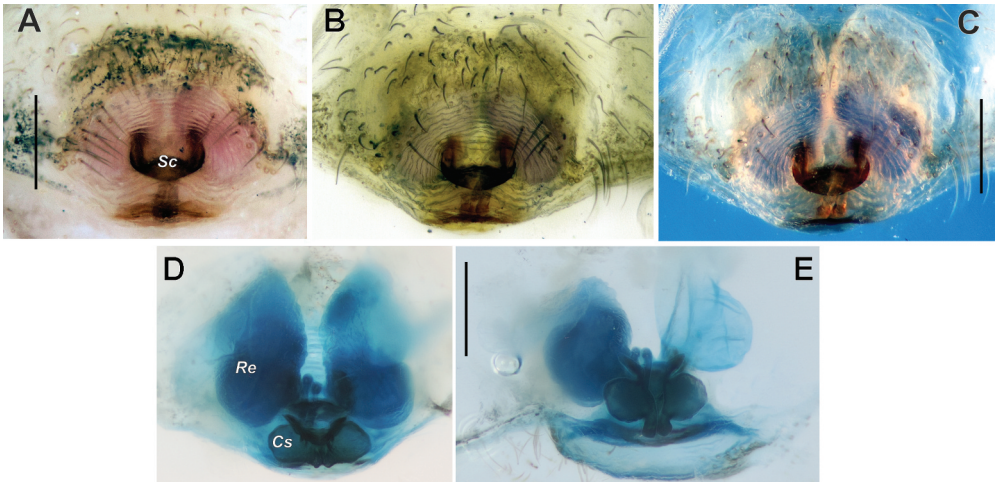

Figure 2. Epigyne of *Oecobius dariusi* **sp. n.** (A) intact, ventral; (B) macerated, ventral; (C) cleared, ventral; (D), (E) dyed, dorsal and posterior. Scale bars = 0.2 mm. Abbreviations: *Cs* – sclerotised capsule, *Re* – receptacle, *Sc* – 'scape'.

Diagnosis

In the shape of the epigyne, the new species resembles *O. latiscapus* Wunderlich, 1992, known only from Tenerife. Both species have a wide 'scape' (*Sc*), a character unknown in the congeners. The new species can be distinguished by the heavily sclerotised tip of scape (vs not sclerotised) and by having many arched wrinkles in the anterior half and three posteriorly to the 'scape' (vs numerous straight wrinkles posteriorly from the 'scape'), and a few straight wrinkles anteriorly from the 'scape' (compare Figure 2A–C and Wunderlich 1992, fig. 283). The vulva of *O. latiscapus* has never been illustrated, and therefore cannot be compared with that of the new species.

Description

Female (holotype). Habitus as in Figure 1A. Total length 3.60. Carapace 0.83 long, 1.09 wide. Eye sizes: AME: 0.08, ALE: 0.09, PLE: 0.06, PME: 0.10. Carapace light yellowish brown, with darker median pattern and marginal stripes. Chelicerae, sternum, labium, and maxillae pale brown. Legs coloured as carapace, with broad annulations. Abdomen greyish brown and mottled with small guanine patches, dorsally with dark brown median pattern and marginal stripe. Spinnerets light greyish brown. Measurements of legs: I: 3.74 (1.02, 0.43, 0.78, 0.85, 0.66), II: 3.96 (1.09, 0.42, 0.83, 0.95, 0.67), III: 3.85 (1.07, 0.40, 0.84, 0.98, 0.56), IV: 4.02 (1.13, 0.41, 0.89, 1.02, 0.57).

Epigyne as in Figure 2A–E; epigynal plate ca as wide as long, with large scape in centre ca 0.4 of width of plate; 'scape' (*Sc*) wider than long, with rounded tip, anterior 2/3 with arched wrinkles (ca 10), posterior 1/3 with ca 3 arched wrinkles; receptacles (*Re*) large oval, 2 times longer than wide, ca 1.1 times longer than epigynal plate; copulatory ducts short; sclerotised capsules (*Cs*) round, contiguous, located posteriorly.

Male. Unknown.

Distribution

Known only from the listed localities in Alborz and Tehran provinces, northern Iran (Figure 9).

Oecobius melanocephalus **sp. n.** (Figures 1G, H, 3A–D)

Oecobius ferdowsii: Zamani *et al*. 2017: 333, fig. 3A–D (♀). – Zamani and Bosselaers 2020: 42, fig. 3A (♀).

Type material

Holotype ♀ (ZMFUM), IRAN: Razavi Khorasan Province: Mashhad, 36.383333°N, 59.383333° E, 20 June 2015 (M. Hatami) [mismatched paratype of *O. ferdowsii*].

Additional material examined

IRAN: Tehran Province: 1♀ (AZMI), Varamin-Pakdasht Rd., wheat field, Water Pump station, 16 April 2001 (A. Bahramishad); Lorestan Province: 1♀ (MHNG), Ma'mulan, 33.377778°N, 47.960417° E, 6 August 1973 (A. Senglet); 1♀ (MHNG), Tang-e-Malavi, 33.263361°N, 47.76225° E, 24 June 1974 (A. Senglet); Semnan Province: 1♀ (ZUCT), road to Shahrud, 36.306417°N, 54.794722°E, 17 May 2016 (A. Zamani).

Etymology

The specific epithet refers to the characteristic black colouration of the carapace in this species.

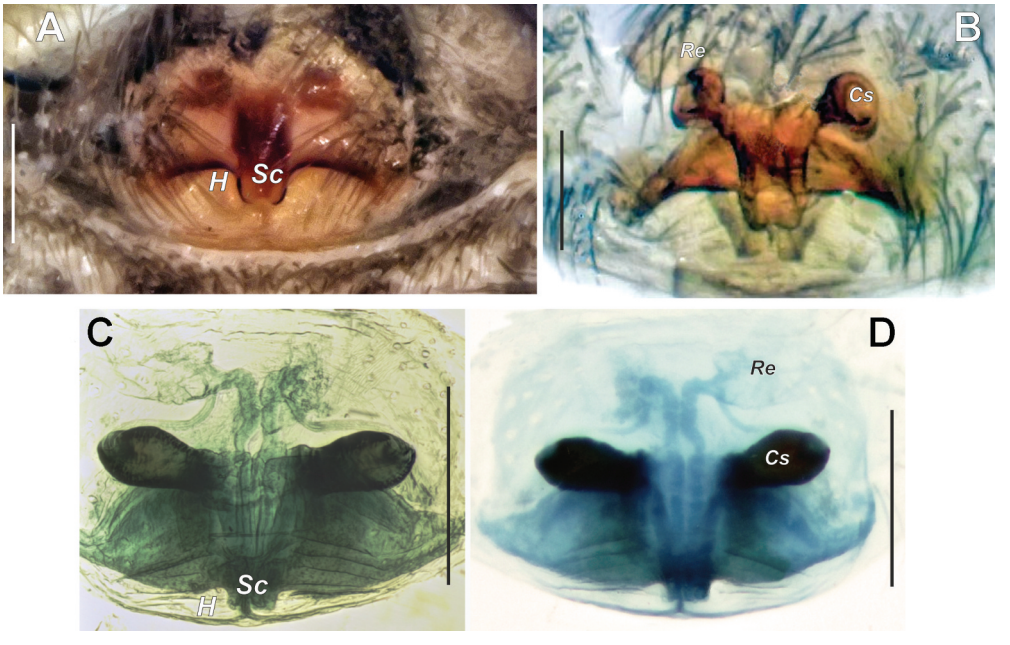

Figure 3. Epigynes of *Oecobius melanocephalus* **sp. n.** (A, B) and *O. fahimii* (C, D). (A) intact, ventral; (B) macerated, dorsal; (C), (D) dyed, dorsal. Scale bars = 0.2 mm. (A), (B) reproduced from Zamani *et al*. (2017). (C), (D) reproduced from Zamani and Marusik (2018). Abbreviations: *Cs* – sclerotised capsule, *H* – 'hood', *Re* – receptacle, *Sc* – 'scape'.

Diagnosis

The new species differs from all its congeners occurring in the region, except for *O. rhodiensis* Kritscher, 1966, by having a uniformly dark carapace. The new species differs from *O. rhodiensis* by dark sternum and venter of abdomen (vs light). The epigyne of the new species is somewhat similar to that of *O. fahimii* Zamani and Marusik, 2018 in the similar position of the sclerotised capsules, but differs by a relatively longer posterior part of 'scape' (*Sc*), 'hoods' (*H*) longer than scape is wide, and round sclerotised capsules (*Cs*) (vs 'scape' wider than 'hoods', sclerotised capsules oval; see Figure 3A–D).

Description

Female (measurements from Zamani *et al*. 2017, p. 335). Habitus as in Figure 1G, H. Total length 2.58. Carapace 0.88 long, 1.00 wide. Eye sizes: AME: 0.08, ALE: 0.09, PLE: 0.04, PME: 0.13. Carapace and sternum uniformly black. Chelicerae, labium, and maxillae dark brown. Legs pale yellowish brown, with distinct annulations. Abdomen black, dorsally mottled with guanine patches and bearing black median band and submedian patches, ventrally slightly lighter, with three light brown longitudinal stripes. Spinnerets slightly lighter than abdomen, uniformly coloured. Measurements of leg I: 2.77 (0.78, 0.28, 0.56, 0.62, 0.53).

Epigyne as in Figure 3A, B; epigynal plate oval, ca 1.3 times wider than long; with distinct, as long as wide 'scape' (*Sc*), and pair of 'hoods' (*H*), twice wider than 'scape'; sclerotised capsules (*Cs*) round, separated by ca 3 diameters; receptacles (*Re*, poorly distinct in Figure 3B) oval, transversal, each shorter than half of epigynal plate width.

Male. Unknown.

Distribution

Known from Lorestan, Tehran, Semnan and Razavi Khorasan provinces, south-western to north-eastern Iran (Figure 9).

Comments

This species was initially described as the female of *O. ferdowsii* Mirshamsi, Zamani and Marusik, 2017. This is herein considered a mismatch: not only are there striking differences in the colouration pattern between the two species (compare Zamani *et al*. 2017, fig. 2A, B and 3A, B), but the results of ongoing research on Central Asian Oecobiinae also indicate that *O. ferdowsii* should be classified within a separate genus. The females of this currently undescribed genus exhibit a completely different conformation of epigyne and vulva compared to those of *O. melanocephalus* **sp. n.**

Oecobius nadiae (Spassky, 1936)

Uroctea nadiae Spassky, 1936: 43, figs 7–9 (♂♀).
Oecobius afghanicus Kullmann and Zimmermann, 1976: 42, figs 1–3, 6–9, 12, 13 (♂♀).
Oecobius nadiae: Zarikian *et al*. 2022: 112, fig, 7A–D (♀).
For the full list of 13 taxonomic entries see the World Spider Catalog (WSC 2023).

Material

IRAN: Tehran Province: 1♂1♀ (ZMMU), Iranian Research Institute of Plant Protection, 35.783333°N, 51.4° E, 7–22 June 2000 (Y.M. Marusik).

Records in Iran

Isfahan, North Khorasan, Razavi Khorasan, South Khorasan, Tehran, Zanjan (Zamani *et al*. 2015, 2018; Sadeghi *et al*. 2016; Zamani 2016; Alimohammadi and Moradmand 2021; present material).

Distribution

Armenia to China (Xinjiang, Sichuan) (WSC 2023).

Oecobius navus Blackwall, 1859
(Figures 1E, F, 4A–D)

Oecobius annulipes: Baum 1972: 117, figs 17–19, 50–53, 62 (♂♀).
Oecobius navus: Wunderlich 1995: 595, figs 31–35 (♂♀).
For the full list of 69 taxonomic entries see WSC (2023).

Material

IRAN: Mazandaran Province: 1♂ (ZMMU), Nashtarud, 36.733333°N, 51.066667°E, 9–10 June 2000 (Y.M. Marusik); 2♀ (ZMMU), Ramsar, 36.916667°N, 50.666667°E, 10 June 2000 (Y.M. Marusik).

Comments

This species differs from the congeners occurring in the region by the dark lateral patches on clypeus, three pairs of sublateral dots on carapace (indistinct in some specimens), and the presence of dots on legs (but not annulations). We noted that it has a kind of retrolateral tibial apophysis (arrowed in Figure 4A), which has not been previously documented.

Distribution

West Palaearctic. Introduced in South Africa, China, Korea, Japan, New Zealand, Canada, USA, South America (WSC 2023). New record for Iran (Figure 9).

Oecobius naxuanus **sp. n.**
(Figures 1B, 5A–C)

Type material

Holotype ♂ (ZMMU), AZERBAIJAN: *Nakhchivan Autonomous Republic*: Dasharkh Vil., 39.55° N, 45.033333°E, 1–4 June 2003 (Y.M. Marusik).

Etymology

The specific epithet refers to Naxuana, which is the name given to Nakhchivan in Ptolemy's *Geography* and in the works of other classical authors.

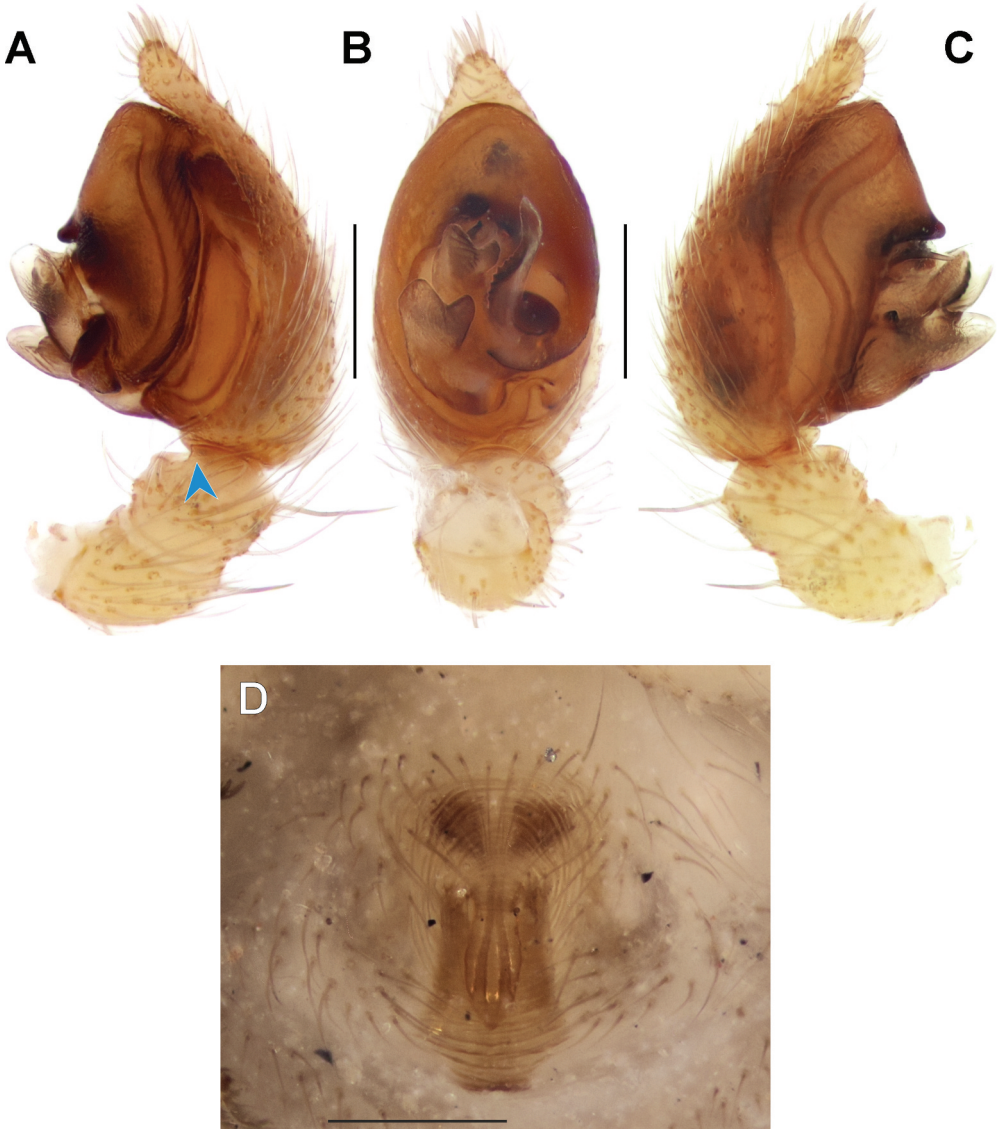

Figure 4. Copulatory organs of *Oecobius navus*. (A) male palp, retrolateral; (B) same, ventral; (C) same, prolateral; (D) intact epigyne, ventral. (C), (D) reproduced from Zamani and Marusik (2018). Arrow points to the tibial apophysis. Scale bars = 0.2 mm.

Diagnosis

In the habitus, the new species is similar to *O. dariusi* **sp. n.,** but differs by having no annulations on the legs (compare Figure 1A and B). In the general conformation of the male palp and particularly the shape of radical apophysis, it is similar to *O. rhodiensis* (compare Figure 5A, C and Demir *et al*. 2009, figs 11, 12, 14, 15), but can be distinguished by the gradually tapering and gently bent radical apophysis (*Ra*) (vs tip not tapering and bent; compare Figure 5C and Wunderlich 1995, fig. 49).

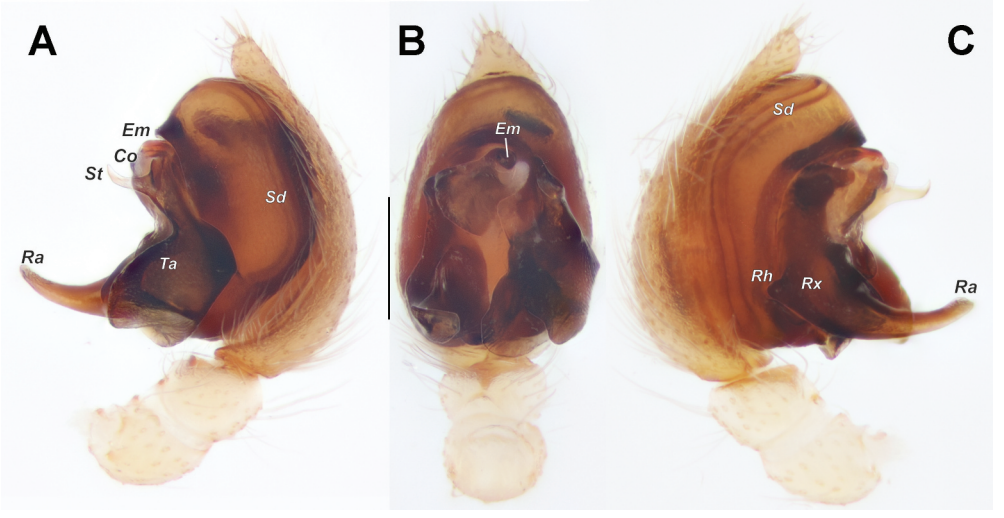

Figure 5. Male palp of *Oecobius naxuanus* **sp. n.** (A) retrolateral; (B) ventral; (C) prolateral. Scale bar = 0.2 mm. Abbreviations: *Co* – 'conductor', *Em* – embolus, *Ra* – radical apophysis, *Rh* – heel of radix, *Rx* – radix, *Sd* – sperm duct, *St* – subterminal apophysis, *Ta* – terminal apophysis.

Description

Male. Habitus as in Figure 1B. Total length 2.17. Carapace 0.75 long, 0.88 wide. Eye sizes: AME: 0.08, ALE: 0.08, PLE: 0.06, PME: 0.09. Carapace yellowish brown, with darker radiating and marginal stripes. Chelicerae, sternum, labium, and maxillae pale brown. Legs coloured as carapace, without annulations. Abdomen greyish brown and mottled with small guanine patches, with dark brown patches. Spinnerets light greyish brown. Measurements of legs: I: 2.79 (0.82, 0.30, 0.61, 0.60, 0.46), II: 2.98 (0.86, 0.32, 0.68, 0.63, 0.49), III: 2.97 (0.82, 0.31, 0.66, 0.69, 0.49), IV: 3.28 (0.95, 0.32, 0.70, 0.81, 0.50).

Palp as in Figure 5A–C; bulb oval in ventral view, 1.4 times longer than wide; sperm duct (*Sd*) not forming loops; terminal apophysis (*Ta*) broad in lateral view, with 2 lobes; subterminal apophysis (*St*) hook-like, bent anteriorly; radix (*Rx*) with long, roundly bent apophysis (*Ra*) and kind of heel (*Rh*); 'conductor' (*Co*) small, membranous; embolus (*Em*) short and thick.

Female. Unknown.

Distribution

Known only from the type locality in Nakhchivan Autonomous Republic, Western Azerbaijan (Figure 9).

Oecobius pasargadae **sp. n.**
(Figures 1C, D, 6A–F)

Type material

Holotype ♂ (MMUE), IRAN: Fars Province: Shiraz, 29.6°N, 52.516667°E, 18–26 May 2000 (Y. M. Marusik). Paratypes: 1♂4♀ (ZMMU), 4♀ (MMUE), same data as for the holotype.

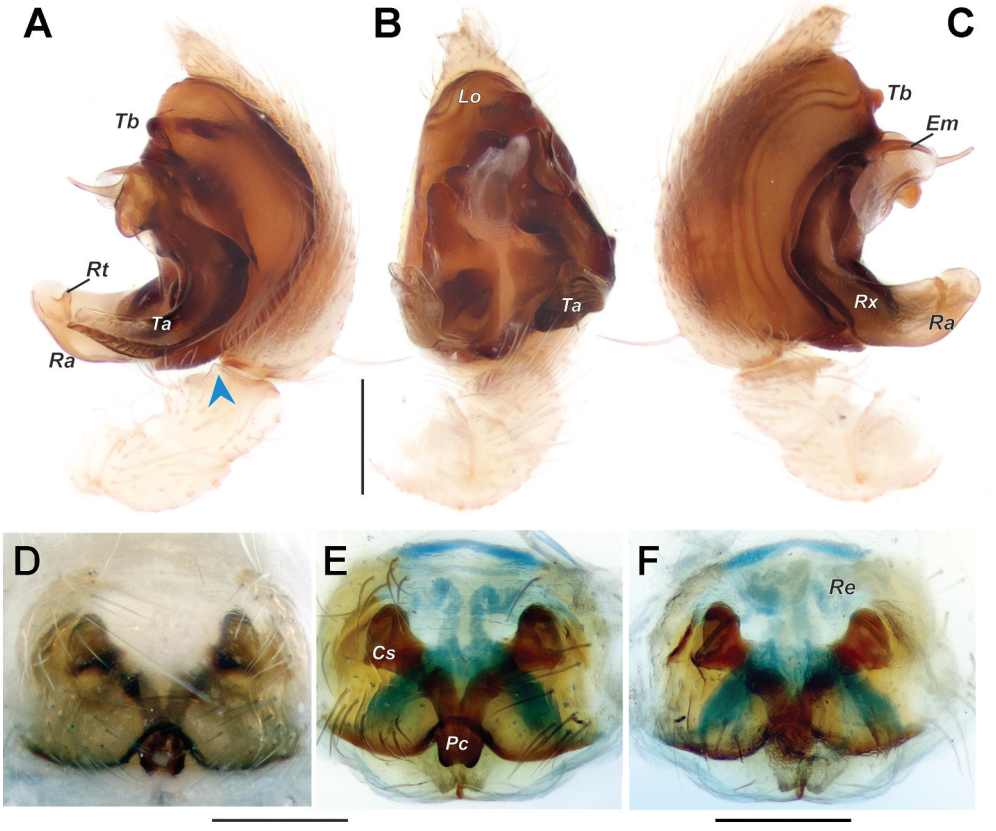

Figure 6. Copulatory organs of *Oecobius pasargadae* **sp. n.** (A) male palp, retrolateral; (B) same, ventral; (C) same, prolateral; (D) intact epigyne, ventral; (E) dyed, ventral; (F) same, dorsal. Arrow points to the tibial apophysis. Scale bars = 0.2 mm. Abbreviations: *Cs* – sclerotised capsule, *Em* – embolus, *Lo* – loop of sperm duct, *Pc* – plate with copulatory openings, *Ra* – radical apophysis, *Re* – receptacle, *Rt* – tooth of radical apophysis, *Rx* – radix, *Ta* – terminal apophysis, *Tb* – tegular bump.

Etymology

The specific epithet refers to the capital of the Achaemenid Empire under Cyrus the Great, which is nowadays an archaeological site approximately 90 km north-east of Shiraz; noun in apposition.

Diagnosis

In the habitus, the new species differs from all of the congeners occurring in the region by lacking a carapace pattern in combination with lacking leg annulations. Its male can be easily distinguished from the congeners occurring in the region by having a tegular bump (*Tb*), almost equally long longitudinal terminal (*Ta*) and radical (*Ra*) apophyses (vs different in length or not elongate), and by having a kind of tooth (*Rt*) on the tip of radical apophysis. The female of the new species differs from all other species known in the region by having an arch-shaped notch of the plate (*Pc*), with the plate bearing copulatory openings (vs plate with extension ('scape') bearing copulatory openings).

Description

Male (holotype). Habitus as in Figure 1C. Total length 2.00. Carapace 0.80 long, 0.95 wide. Eye sizes: AME: 0.07, ALE: 0.08, PLE: 0.05, PME: 0.11. Carapace light yellowish brown. Chelicerae, sternum, labium, and maxillae pale brown. Legs coloured as carapace, without annulations. Abdomen greyish brown and mottled with small guanine patches. Spinnerets light greyish brown. Measurements of legs: I: 3.12 (0.90, 0.32, 0.68, 0.68, 0.54), II: 3.18 (0.90, 0.31, 0.72, 0.70, 0.55), III: 3.10 (0.83, 0.31, 0.68, 0.74, 0.54), IV: 3.29 (0.94, 0.29, 0.74, 0.81, 0.51).

Palp as in Figure 6A–C; tibia with a kind of retrolateral apophysis (arrowed in Figure 6A); bulb subtriangular in ventral view; tegulum with 'bump' (*Tb*) in anterior part; sperm duct with small loop (*Lo*) in anterior part of tegulum; terminal apophysis (*Ta*) gutter-shaped in retrolateral view, with transverse wrinkles; radix (*Rx*) with broad radical apophysis (*Ra*) bearing kind of tooth (*Rt*) at mesal part.

Female. Habitus as in Figure 1D. Total length 2.80. Carapace 0.74 long, 0.83 wide. Eye sizes: AME: 0.06, ALE: 0.08, PLE: 0.05, PME: 0.09. Colouration as in male. Measurements of legs: I: 2.93 (0.86, 0.30, 0.61, 0.63, 0.53), II: 3.02 (0.82, 0.31, 0.66, 0.69, 0.54), III: 2.89 (0.78, 0.31, 0.62, 0.72, 0.46), IV: 3.18 (0.88, 0.32, 0.73, 0.79, 0.46).

Epigyne as in Figure 6D–F; epigynal plate ca 1.3 times wider than long; posterior part with arched notch occupied by kind of plate with copulatory openings (*Pc*); copulatory ducts terminally fused; sclerotised capsules (*Cs*) oval, diverging; receptacles (*Re*) oval transversal (not clearly visible on Figure 6F).

Distribution

Known only from the type locality in Fars Province, south-central Iran (Figure 9).

Oecobius putus O. Pickard-Cambridge, 1876

Oecobius putus: Baum 1972: 125, figs 31, 32, 58–61, 64 (♂♀).
Oecobius putus: Kullmann and Zimmermann 1976: 44, figs 4, 5, 10, 11 (♂♀).
For the full list of 18 taxonomic entries see WSC (2023).

Material

IRAN: Fars Province: 16♂27♀ (ZMMU), Shiraz, 29.6°N, 52.516667°E, 18–26 May 2000 (Y.M. Marusik); Tehran Province: 2♂4♀ (ZMMU), Iranian Research Institute Iranian Research Institute of Plant Protection, 35.783333°N, 51.4°E, 7–22 June 2000 (Y.M. Marusik).

Records in Iran

Fars, Hormozgan, Khuzestan, Mazandaran, Tehran (Zamani 2016; Zamani *et al*. 2016; Zamani and Mozaffarian 2017; Boukan *et al*. 2018; Zamani and Bosselaers 2020; Hosseinpour *et al*. 2022; present material).

Distribution

South Africa, Egypt, Cyprus, Sudan to Iran, Azerbaijan, Afghanistan, India. Introduced in USA, Mexico (WSC 2023). Synanthropic species.

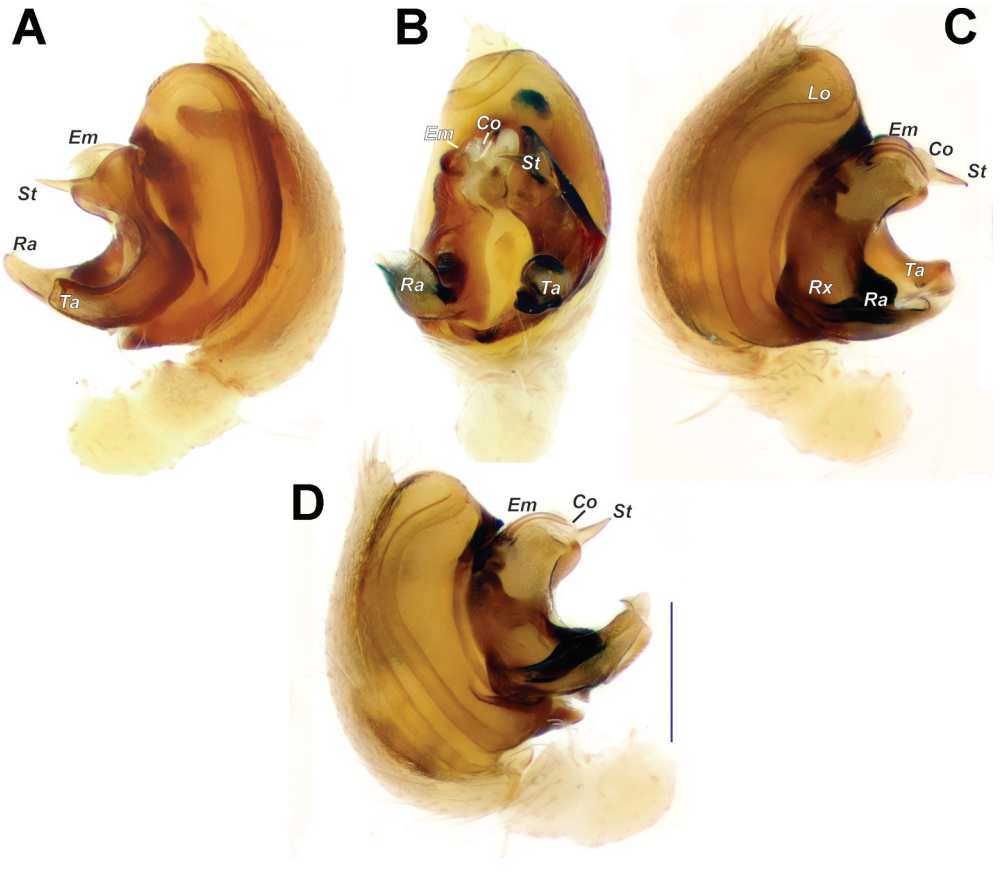

Figure 7. Male palp of *Oecobius zagros* **sp. n.** (A) retrolateral; (B) ventral; (C), (D) prolateral, slightly different angles. Scale bar = 0.2 mm. Abbreviations: *Co* – 'conductor', *Em* – embolus, *Lo* – loop of sperm duct, *Ra* – radical apophysis, *Rx* – radix, *St* – subterminal apophysis, *Ta* – terminal apophysis.

Oecobius zagros **sp. n.**
(Figures 1I, 7 A–D, 8A–D)

Type material

Holotype ♂ (MHNG), IRAN: Kermanshah Province: Dizgaran, 33.733333°N, 46.983333° E, 16 May 1974 (A. Senglet).

Etymology

The specific epithet is a noun in apposition, referring to a long mountain range in Iran, northern Iraq and south-eastern Turkey, in which the type locality of the new species is situated.

Diagnosis

In the general conformation of the male palp and particularly the shape of radical apophysis, the new species is most similar to *O. ilamensis* Zamani, Mirshamsi and

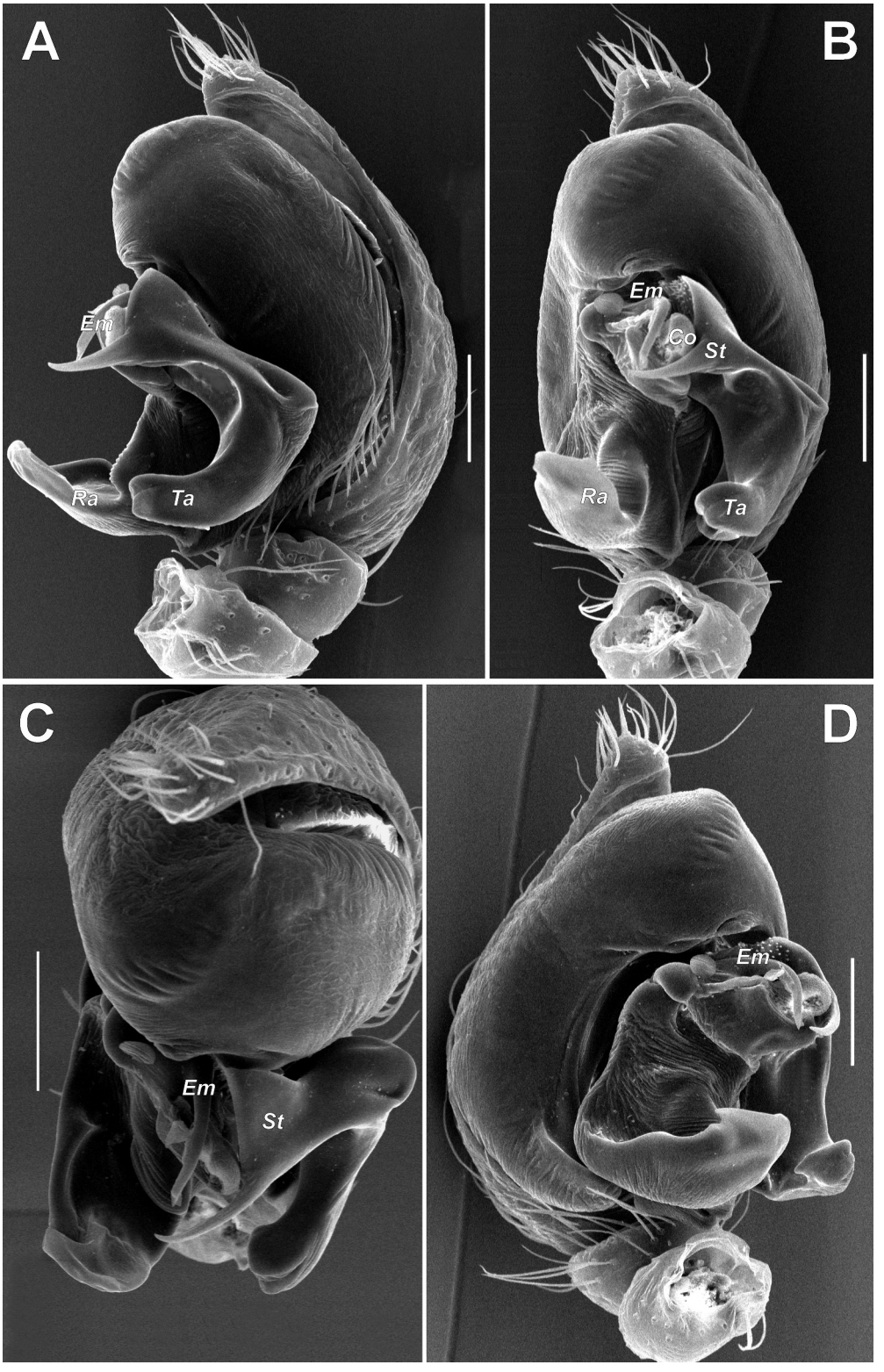

Figure 8. Scanning electron microscopy images of the male palp of *Oecobius zagros* **sp. n.** (A) retrolateral; (B) ventral; (C) anterior; (D) proventral. Scale bar = 0.1 mm. Abbreviations: *Co* – 'conductor', *Em* – embolus, *Ra* – radical apophysis, *St* – subterminal apophysis, *Ta* – terminal apophysis.

Marusik, 2017, a species so far known only from Ilam Province in western Iran (Zamani *et al*. 2017). The male palp of the new species differs from that of *O. ilamensis* by having straight, spine-like subterminal apophysis (*St*) (vs with bent tip) and abrupt tip of terminal apophysis (*Ta*) (vs finger-shaped) (compare Figure 7D and Zamani *et al*. 2017, fig. 1C).

Description

Male. Habitus as in Figure 1I. Total length 1.65. Carapace 0.60 long, 0.72 wide. Eye sizes: AME: 0.04, ALE: 0.06, PLE: 0.06, PME: 0.08. Carapace yellowish brown, with darker median and marginal stripes. Chelicerae, sternum, labium, and maxillae pale brown. Legs coloured as carapace, with faint annulations. Abdomen greyish brown and mottled with small guanine patches, with dark brown patches. Spinnerets light greyish brown. Measurements of legs: I: 2.27 (0.65, 0.27, 0.48, 0.49, 0.38), II: 2.29 (0.67, 0.25, 0.48, 0.48, 0.41), III: femur 0.67, patella 0.24, rest of the segments missing, IV: 2.56 (0.72, 0.28, 0.54, 0.61, 0.41).

Palp as in Figures 7A–D, 8A–D; bulb oval in ventral view, ca 1.7 times longer than wide; sperm duct with small loop (*Lo*) in anterior part of tegulum; radix (*Rx*) long, with claw-like apophysis (*Ra*); subterminal apophysis (*St*) spine-like; terminal apophysis (*Ta*) long, with abrupt tip; 'conductor' (*Co*) membranous, as long as wide; embolus (*Em*) claw-like, almost as long as subterminal apophysis.

Female. Unknown.

Distribution

Known only from the type locality in Kermanshah Province, western Iran (Figure 9). On the label, the locality is listed as Lorestan Province, while the coordinates refer to another locality in Ilam Province. We consider Dizgaran in Kermanshah to be the correct type locality.

Discussion

Based on the results of this paper, 11 species of *Oecobius* are known from Iran. Among these, seven species exhibit a similar conformation of the copulatory organs and can be considered to fall within the same species group. These species are as follows: *O. cellariorum* (Dugès, 1836) [♂♀]; *O. fahimii* Zamani and Marusik, 2018 [♀]; *O. ilamensis* Zamani, Mirshamsi and Marusik, 2017 [♂]; *O. melanocephalus* **sp. n.** [♀]; *O. pasargadae* **sp. n.** [♂♀]; *O. putus* O. Pickard-Cambridge, 1876 [♂♀]; *O. zagros* **sp. n.** [♂]. It is important to note that while two of these species are currently known only from males and two are known only from females, we do not believe that they are conspecific, due to their different colouration patterns and distribution range. To verify this, however, it is necessary to collect material of both sexes for these four nominal species. The species newly described from Azerbaijan in this paper, *O. naxuanus* **sp. n.,** also belongs to this species group, and it represents the first endemic species of this genus from the Caucasus (Otto 2022).

Each of the remaining four species of Iranian *Oecobius* represents a distinct species group: *O. dariusi* **sp. n.** [♀]; *O. ferdowsii* Mirshamsi, Zamani and Marusik, 2017 [♂]; *O. nadiae* (Spassky, 1936) [♂♀]; *O. navus* Blackwall, 1859 [♂♀].

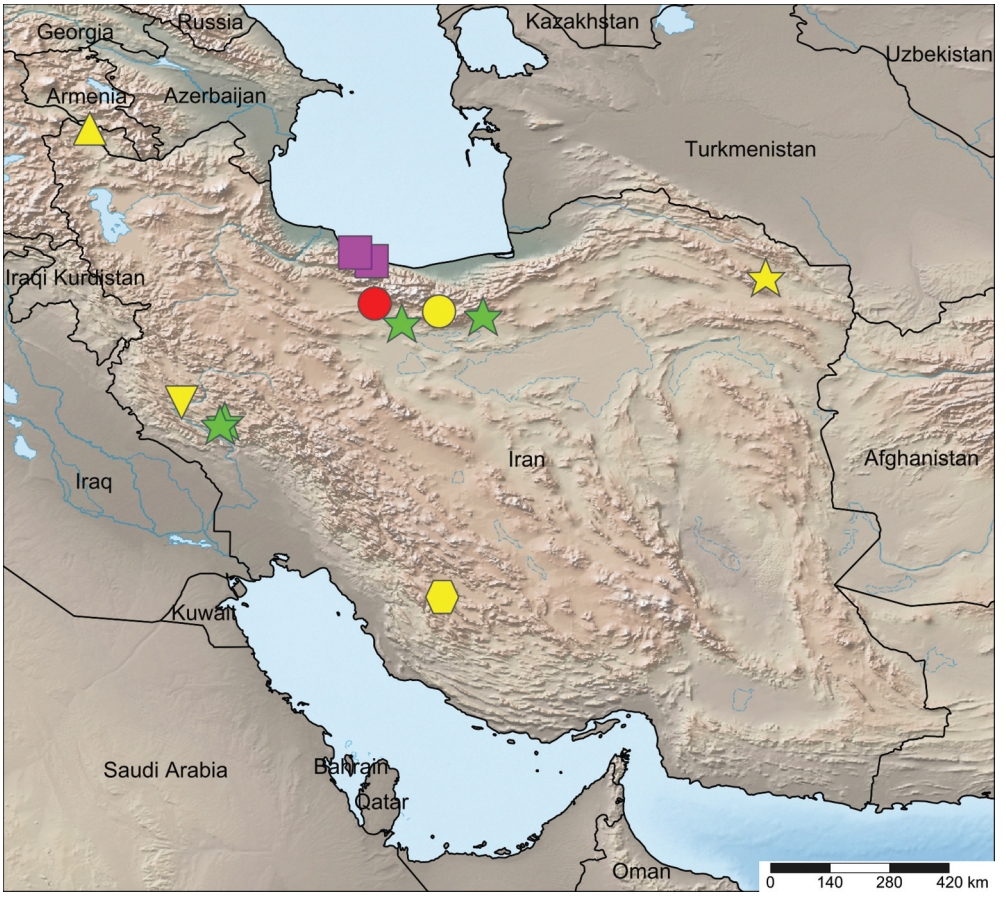

Figure 9. Collection localities of the newly described/recorded species of *Oecobius*. **Circles** – *O. dariusi* **sp. n.; stars** – *O. melanocephalus* **sp. n.; squares** – *O. navus*; **triangle** – *O. naxuanus* **sp. n.; hexagon** – *O. pasargadae* **sp. n.; inverted triangle** – *O. zagros* **sp. n.** Yellow symbols indicate the type localities.

The taxonomy of the group comprising *O. ferdowsii* will be addressed in a separate publication. Prior to this study, *O. ferdowsii* was thought to have a widespread distribution in Iran, with material collected from several localities in the south-western, northern, and north-eastern parts of the country. However, our research revealed that the females previously attributed to this species were actually misidentified and are therefore described in this paper as a new species (*O. melanocephalus* **sp. n.**). Consequently, *O. ferdowsii* is now confidently known only from Razavi Khorasan Province in north-eastern Iran. The record of this species from Kazakhstan (Fomichev 2022) also appears to be based on a misidentification, likely resulting from the lack of illustration of the ventral aspect of the male palp in the original description.

During the preparation of this paper, we discovered an error in two of our previous works involving male specimens of *Oecobius* (Marusik *et al*. 2015; Zamani *et al*. 2017), and also in Fomichev (2022). Despite using the terminology proposed by Baum (1972), we overlooked that he had depicted the right palps rather than the standard left ones. This

oversight led to inaccuracies in identifying the structures of the male palp. Consequently, in those papers, what is originally identified as the radical apophysis is, in fact, the terminal apophysis, and vice versa. Similarly, the designation of the embolus should be attributed to the subterminal apophysis, and vice versa.

Acknowledgements

We thank Lionel Monod and Peter Schwendinger (Geneva, Switzerland) for providing us with the material of Senglet's collection held in MHNG, and Alexander A. Fomichev (Barnaul, Russia) and an anonymous reviewer for their comments on the manuscript. YMM is grateful to Ilari Eerikki Sääksjärvi and Seppo Koponen for arranging his stay in Turku.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The authors reported there is no funding associated with the work featured in this article.

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