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Authors: Zamani, Alireza, Hosseini, Marzieh Sadat, and Moradmand, Majid

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New data on jumping spiders of Iran, with a new species of *Salticus* (Araneae: Salticidae)

Alireza Zamani, Marzieh Sadat Hosseini & Majid Moradmand



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Abstract. On the basis of recently collected specimens in various regions of Iran, new data on jumping spiders (Salticidae) of this country are provided. One species, *Salticus lucasi* **sp. nov.** (♂, Isfahan Province, central Iran) is described as new to science, and three species (*Chalcoscirtus platnicki* Marusik, 1995, *Mogrus larisae* Logunov, 1995 and *Phlegra yaelae* Prószyński, 1998) are recorded in Iran for the first time. A further 21 species represent new provincial records..

Keywords: faunistics, new records, taxonomy

Zusammenfassung: Neue Daten über Springspinnen aus dem Iran, mit einer neuen *Salticus*-Art (Araneae: Salticidae). Daten aktueller Springspinnen-Aufsammlungen (Salticidae) aus verschiedenen Regionen im Iran werden präsentiert. Eine Art, *Salticus lucasi* **sp. nov.** (♂, Provinz Isfahan, Zentral-Iran) wird neu beschrieben und drei Arten (*Chalcoscirtus platnicki* Marusik, 1995, *Mogrus larisae* Logunov, 1995, *Phlegra yaelae* Prószyński, 1998) werden erstmals für den Iran nachgewiesen. Weitere 21 Arten stellen neue Provinz-Nachweise dar.

Salticidae, commonly known as jumping spiders, is the largest family of spiders with 6173 extant species in 646 genera from around the world; 108 species of jumping spiders are currently known from Iran (WSC 2020, Zamani et al. 2020). The type genus, *Salticus* Latreille, 1804, currently includes 47 valid species. During recent investigations on the systematics and faunistics of Iranian spiders, a new species of this genus was discovered, which is described and illustrated in this paper. Moreover, a collection of jumping spiders deposited in the Zoological Museum of University of Isfahan (Iran) was studied, the results of which are presented herein.

Material and methods

Specimens were photographed using an Olympus Camedia E-520 camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum of the University of Turku. Digital images were prepared using "CombineZP" image stacking software, and illustrations of the dissected bulb were made after clearing in 10% KOH aqueous solution. Leg segments were measured on the dorsal side, and all measurements are given in millimeters. Measurements of legs are listed as: total length (femur, patella, tibia, metatarsus, tarsus). Abbreviations not explained within the text: **AME** anterior median eye, **ALE** anterior lateral eye, **Mt** metatarsus, **PME** posterior median eye, **pl** prolateral, **PLE** posterior lateral eye, **rl** retrolateral, **Ti** tibia, **v** ventral. The specimens are deposited in the Manchester Museum of the University of Manchester (MMUE), and the Zoological Museum of the University of Isfahan (ZMUI).

Results

Study of the collection of jumping spiders deposited in the ZMUI resulted in the identification of 24 species that represent new records either for Iran (three, listed below) or the province of Isfahan (21, listed in Tab. 1).

Family Salticidae Blackwall, 1841

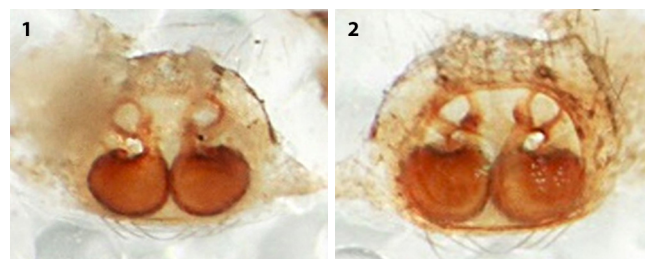
Genus *Chalcoscirtus* Bertkau, 1880

Chalcoscirtus platnicki Marusik, 1995 (Figs 1-2)

Chalcoscirtus platnicki: Logunov & Marusik 1999: 217, figs 55-56, 59-61 (♂♀).

Material examined. 1 ♀ (ZMUI 35136), IRAN: Isfahan Province: Chadegan county, Rozveh, Dalan-Kouh Protected Area, 33.63111°N, 50.56861°E, May 2016 (leg. S. Alimohammadi).

Distribution. This species was hitherto known from several localities in Kazakhstan (WSC 2020); thus, our record from Isfahan is the southernmost in the whole range.



Figs 1-2: Dissected epigyne of *Chalcoscirtus platnicki* from Rozveh, Dalan-Kouh Protected Area. **1.** dorsal; **2.** ventral view.

Genus *Mogrus* Simon, 1882

Mogrus larisae Logunov, 1995

Mogrus larisae Logunov 1995: 596, figs 1-4, 7, 18-30 (♂♀).

Material examined. 1 ♀ (ZMUI 35142), IRAN: Isfahan Province: Natanz county, Matin Abad, 33.75277°N, 51.9925°E, Jun. 2016 (leg. A. Sadeghi).

Distribution. This species has been recorded from eastern Europe (Ukraine) and Central Asia (Kazakhstan, Uzbekistan, Turkmenistan and Kyrgyzstan) and herein recorded in the gap in the Middle East (Iran) for the first time, which represents the southernmost record in the whole range (WSC 2020).

Genus *Phlegra* Simon, 1876

Phlegra yaelae Prószyński, 1998

Phlegra yaelae: Prószyński 2003: 136, figs 536-542 (♂♀).

Material examined. 1 ♀ (ZMUI 35126), IRAN: Ilam Province: Ilam county, Manesht Mountains slope, 33.68722°N, 46.44527°E, Jun. 2011 (leg. M. Moradmand).

Alireza ZAMANI, Zoological Museum, Biodiversity Unit, FI-20014 University of Turku, Finland; E-mail: zamani.alireza5@gmail.com
Marzieh S. HOSSEINI & Majid MORADMAND, Department of Plant and Animal Biology, Faculty of Biological Sciences and Technology, University of Isfahan, Isfahan, Iran; E-mail: ms.hosseini.life@gmail.com, moradmand.arachnids@gmail.com

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Distribution. This species was previously recorded from Israel (type locality) and Tunisia, and now it is recorded from its easternmost distribution in western Iran (WSC 2020).

Genus *Salticus* Latreille, 1804

Salticus lucasi sp. nov. (Figs 3-10)

Type material. Holotype ♂ (MMUE G7624.1): IRAN, Isfahan Province: Qamsar & Barzok Protected Area, 55 km SW of Qamsar, 14 km NE Kamoo, near the road of Gargash observatory, 33.63111°N, 51.33111°E, 2710 m. a.s.l., 19. May 2016 (leg. P. Ponel); paratypes: 1 ♂ (MMUE G7624.2), same data as for the holotype; 1 ♂ (ZMUI 35144), Isfahan Province: Chadehan county: Rozveh, Dalan-Kouh Protected

Area, 32.83667°N, 50.56861°E, May 2016 (leg. S. Alimohammadi).

Etymology. The species is named after Lucas the Spider, an animated character created by animator Josh Slice on the basis of the anatomy of jumping spiders, in recognition of the role that it played in “curing” many arachnophobes around the world.

Diagnosis. This species can be easily distinguished from most congeners by the unique form of the terminal apophysis, consisting of one anterior and one posterior blade behind the embolus, and by the unique shape of the retrolateral tibial apophysis. It seems to be closely related to *Salticus noordami* Metzner, 1999, having a similar shape of the RTA and overall

Tab. 1: List of studied Iranian salticid material representing new provincial records. Detailed collection localities are as follows:

1) Isfahan Province: Isfahan, June 2016–2017 (leg. M. Hosseini, M. Moradmand); **2) Chadehan, Rozveh,** May 2016 (leg. S. Alimohammadi); **3) Najaf Abad,** May 2016 (leg. M. Salehi); **4) Tiran & Karwan, Dolat Abad,** May 2016 (leg. M. Moradmand); **5) Isfahan,** Jul. 2006 (leg. M. Marhabaei); **6) Ilam Province:** Mahnesht, Jun. 2009 (leg. M. Moradmand, B. Fathinia); **7) Shemsheh,** Jun. 2009 (leg. M. Moradmand, B. Fathinia); **8) Mehran,** Jun. 2009 (leg. M. Moradmand, B. Fathinia); **9) Kohgiluyeh & Buyer-Ahmad Province:** Yasuj, Mah Parviz, May 2017 (leg. M. Moradmand, B. Fathinia); **10) Kurdistan Province:** Kamyaran, Takht-e Sangi, May 2014 (leg. M. Moradmand); **11) Yazd Province:** Khatam, Harat, Oct. 2008 (leg. Mahmoodi); **12) Markazi Province:** Mahalat, Oct. 2006 (leg. M. Marhabaei); **13) Fars Province:** Shiraz, Dasht-e Arjan, May 2015 (leg. M. Moradmand); **14) Alborz Province:** Karaj, Dec. 2015 (leg. Dashti); **15) Chaharmahal & Bakhtiari Province:** Lordegan, Apr. 2015 (leg. M. Moradmand)

Species	Distribution (after WSC 2020)	Material
<i>Aelurillus concolor</i> Kulczyński, 1901	Greece, North Macedonia, Turkey, Azerbaijan, Georgia, Iran, Turkmenistan, Kazakhstan, Kyrgyzstan, Russia	1 ♀, Yazd (11); 1 ♂, Markazi (12)
<i>Aelurillus khorasanicus</i> Azarkina & Mirshamsi, 2014	Iran	6 ♂♂, Isfahan (2)
<i>Aelurillus marusiki</i> Azarkina, 2002	Iran	1♀, Isfahan (1); 6 ♂♂, Isfahan (2); 1 ♂, Isfahan (3)
<i>Chalcoscirtus parvulus</i> Marusik, 1991	Greece, Iran, Afghanistan, Kazakhstan, Russia, Tajikistan, Turkey, Turkmenistan, Uzbekistan	2 ♀♀, Isfahan (2)
<i>Cyrba algerina</i> (Lucas, 1846)	Canary Is. to Central Asia	2 ♀♀, Isfahan (2); 2 ♂♂, Isfahan (4); 1 ♀, Kohgiluyeh (9)
<i>Evarcha insularis</i> (Metzner, 1999)	Greece, Turkey, Iraq, Azerbaijan, Iran	5 ♂♂ 5♀♀, Isfahan (1); 1 ♂, Alborz (14); 1 ♂, Kurdistan (10)
<i>Heliophanus dunini</i> Rakov & Logunov, 1997	Turkey, Ukraine, Azerbaijan, Iran, Kazakhstan	2 ♀♀, Fars (13)
<i>Heliophanus equester</i> L. Koch, 1867	Italy to Azerbaijan, Iran	1 ♀, Kohgiluyeh (9)
<i>Heliophanus forcipifer</i> Kulczyński, 1895	Armenia, Iran, Kazakhstan, Russia, Syria, Tajikistan, Uzbekistan	1 ♀, Ilam (8)
<i>Heliophanus mordax</i> (O. Pickard-Cambridge, 1872)	Greece to Central Asia	1 ♀, Kurdistan (10)
<i>Heliophanus xerxes</i> Logunov, 2009	Iran	1 ♂, Isfahan (2); 1 ♂, Ilam (6); 1 ♂, Chaharmahal (15)
<i>Mexcala farsensis</i> Logunov, 2001	Iran	1 ♀, Isfahan (2)
<i>Pellenes bonus</i> Logunov, Marusik & Rakov, 1999	Ukraine (Crimea), Azerbaijan, Iran, Turkmenistan	5 ♂♂, Isfahan (2)
<i>Phlegra bresnieri</i> (Lucas, 1846)	Southern Europe, Northern Africa to Turkey, Azerbaijan, Iran	2 ♂♂, Isfahan (2)
<i>Plexippoides flavescens</i> (O. Pickard-Cambridge, 1872)	Greece to Central Asia, Pakistan, Sudan	1 ♂ 3 ♀♀, Ilam (6)
<i>Plexippus clemens</i> (O. Pickard-Cambridge, 1872)	Algeria, Egypt, Turkey, Israel, Yemen, India, Iran	1 ♂, Ilam (7)
<i>Rudakius spasskyi</i> (Andreeva, Hęciak & Prószyński, 1984)	Azerbaijan, Iran, Central Asia	1 ♂ 1 ♀, Isfahan (5)
<i>Salticus tricinctus</i> (C. L. Koch, 1846)	Mediterranean to Central Asia	1 ♂, Ilam (6)
<i>Stenaelurillus marusiki</i> Logunov, 2001	Iran	1 ♂, Isfahan (1)
<i>Synageles persianus</i> Logunov, 2004	Armenia, Azerbaijan, Iran	2 ♂♂ 1 ♀, Isfahan (1)
<i>Thyene imperialis</i> (Rossi, 1846)	Southern Europe, North and East Africa, Middle East to Central Asia and China, India, Indonesia	4 ♂♂, Isfahan (5)

bulb morphology, but can be distinguished by the presence of a distinct posterior bulge (Pb) on the bulb (Figs 9-10) (vs. absent, cf. Metzner 1999: 115, fig. 79a-f).

It is worth mentioning that with respect to both the embolic division and the RTA, there are four other species that also appear very close to the new species: *Salticus cingulatus* (Panzer, 1797), *S. mandibularis* (Simon, 1868), *S. olivaceus* (L. Koch, 1867) and *S. unciger* (Simon, 1868). All of these species have a multi-pronged terminal apophysis very much like that of *S. lucasi* **sp. nov.**, and all have a long blade-like RTA. As the available illustrations in the literature are not informative enough, the status of the terminal apophysis in those species is not clear; nonetheless, they differ from *S. lucasi* **sp. nov.** by the absence of both a posterior bump on the bulb (Pb) and a ventral bulge on the RTA.

Description. Male (holotype). Habitus as in Figs 3-5. Total body length 4.12 (excluding the chelicerae). Carapace 2.08 long, 1.62 wide, 0.80 high. Sternum 0.94 long, 0.66 wide. Eye sizes: AME 0.39, ALE 0.24, PME 0.07, PLE 0.21. General coloration black, with numerous light grey setae on pars cephalica, the mid area of pars thoracica and opisthosoma. Sternum, labium and maxillae the same colour as carapace, with whitening in the anterolateral sides of maxillae. Cheli-

cerae dark reddish brown. Opisthosoma without any distinct pattern (Figs 3-4). Legs light yellowish brown, with darker patterns on femora (Fig. 3). Measurements of legs: I: 5.87 (1.55, 1.03, 1.55, 1.19, 0.55), II: 4.34 (1.24, 0.85, 0.99, 0.78, 0.48), III: 4.29 (1.25, 0.70, 0.95, 0.89, 0.50), IV: 4.45 (1.33, 0.67, 1.08, 0.89, 0.48). Spination of legs: I: Ti 2pl, 2rl, Mt 2pl, 2rl, II: Ti 2v, Mt 2pl, 2rl, III and IV: Ti 2v.

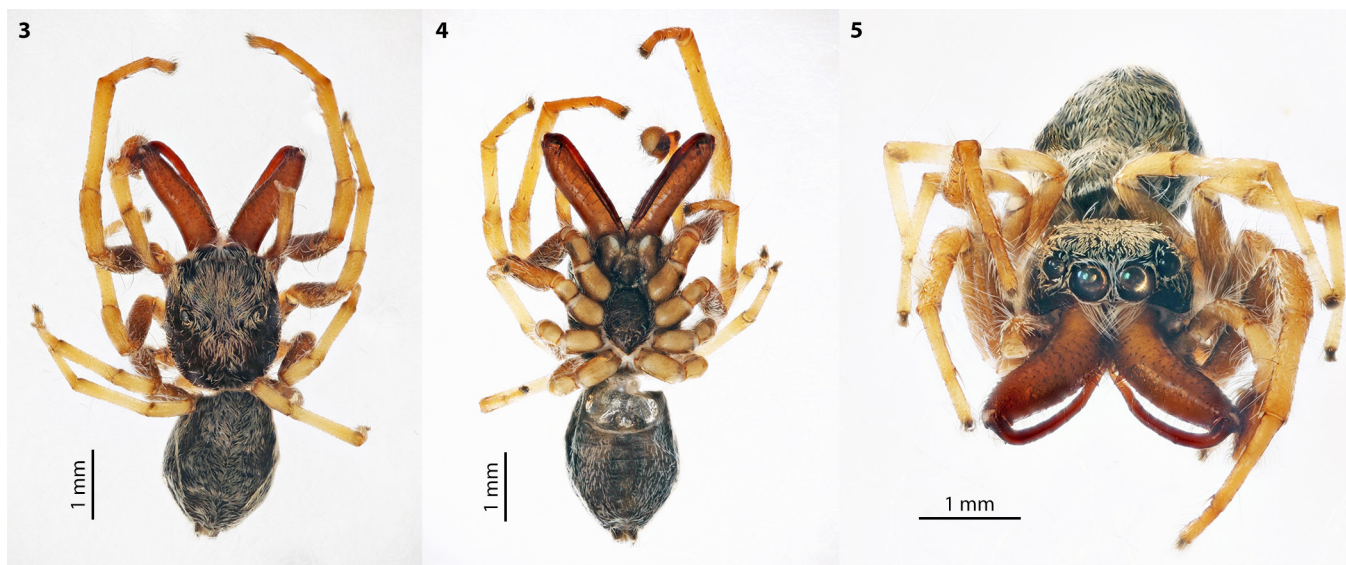
Palp as in Figs 5-10. Retrolateral tibial apophysis (RTA) strong, extending to the almost half the size of cymbium, with a distinct bulge ventrally; bulb longer than wide, with a posterior bulge (Pb); embolic base (EmB) located at an approximately 3 o'clock position, leading to the embolus (Em) terminating in the apical part, located in a ventral position to two blades of terminal apophysis, almost touching the shorter anterior blade (ATA).

Female. Unknown.

Distribution. Known only from two localities in Isfahan Province, central Iran. Beside the newly described species, there are six other species of *Salticus* known from Iran (Tab. 2).

Discussion

Considering the results of the current paper, there are now 112 species belonging to 40 genera of salticids recorded from



Figs 3-5: Habitus of male *Salticus lucasi* **sp. nov.**, holotype. **3.** dorsal; **4.** ventral; **5.** frontal view



Figs 6-10: Copulatory organs of holotype (6-8) and paratype (MMUE) (9-10) male *Salticus lucasi* **sp. nov.** Palp in **6.** retrolateral; **7.** ventral; **8.** prolateral views. Bulb after expansion in KOH in **9.** ventral; **10.** apical views. Abbreviations: ATA anterior blade of terminal apophysis; Em embolus; EmB embolic base; PTA posterior blade of terminal apophysis; RTA retrolateral tibial apophysis. Scale bars: 0.2 mm

Tab. 2: List of *Salticus* spp. currently known from Iran, along with their global distribution ranges (WSC 2020) and known Iranian records

Species	Distribution	Records in Iran
<i>Salticus cingulatus</i> (Panzer, 1797)	Europe, Turkey, Iran, Russia to Kazakhstan, Mongolia	Kerman (Roewer 1955)
<i>Salticus insperatus</i> Logunov, 2009	Iran	Mazandaran (Logunov 2009)
<i>Salticus lucasi</i> sp. nov.	Iran	Isfahan (current data)
<i>Salticus noordami</i> Metzner, 1999	Greece, Turkey, Cyprus, Israel, Iran	Markazi, West Azerbaijan (Logunov 2009)
<i>Salticus scenicus</i> (Clerck, 1757)	North America, Europe, Russia (Europe to Far East), Caucasus, Iran, Kazakhstan	Gilan, Razavi Khorasan, Zanjan (Ghavami 2006, Ghavami & Amooz 2008)
<i>Salticus tricinctus</i> (C. L. Koch, 1846)	Israel to Central Asia	Fars, Kohgiluyeh & Boyer-Ahmad, Lorestan, Mazandaran, Razavi Khorasan, Tehran (Logunov et al. 2002, 2013, Zamani et al. 2018; Hosseinpour et al. 2019), Ilam (current data)
<i>Salticus zebraneus</i> (C. L. Koch, 1837)	Europe, Turkey, Iran	Golestan (Zamani 2015)

Iran. In comparison to the adjacent countries, only Turkey is represented by a higher number of species (134), while Azerbaijan has a slightly lower number of known salticids (108) (Danışman et al. 2019, Otto 2019). Currently, this family is represented by 18 Iranian endemic species (including the new one described here), most of which have been described during the past two decades (Zamani et al. 2020). Considering the vast area of the country, its position as a bridge between three zoogeographical realms (Palearctic, Afrotropical and Oriental), and the lack of large-scale taxonomic and faunistic revisions in the region, it is expected that the true species diversity of Iranian jumping spiders should be considerably higher than what is currently known.

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