



### A new species of burrowing wolf spiders (Araneae: Lycosidae: *Lycosa*) from Iran

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With over 2400 species in 123 genera, Lycosidae is one of the largest spider families (WSC 2017). For over two hundred years, the type genus *Lycosa* Latreille, 1804 have accumulated large-sized wolf spiders from all over the world. Thus, with 218 nominal species, this genus is distributed in all zoogeographical regions (WSC 2017). Almost none of the species currently classified in *Lycosa* appear to be related to the type species—*L. tarantula* (Linnaeus, 1758); hence, the genus is polyphyletic and should be divided into several genera. This process has been already started; for example, in Australia and New Zealand where many of large wolf spiders have been removed from *Lycosa* (Roewer 1955, 1959, 1960; Vink 2002; Framenau & Baehr 2016). Also, some Holarctic, Neotropic and Afrotropic species were transferred from *Lycosa* to other genera (for a complete list of references see WSC 2017). In the Palaearctic, *Lycosa* is represented by 60 species (WSC 2017) and remains almost unrevised. From the southern Palaearctic, Saharo-Gobian desert region (Yemel'yanov 1974), 36 species of *Lycosa* have been recorded to date, 6 of which are poorly described (WSC 2017).

The family is relatively poorly studied in Iran: only 65 species of 17 genera have been recorded from this country, with a rough estimation of at least 100–110 expected total species diversity (Zamani *et al.* 2017). Of the genus *Lycosa* (as listed in WSC 2017), three species are currently known from Iran (Zamani *et al.* 2017): *L. praegrans* C.L. Koch, 1836, with a Western Palaearctic distribution (Roewer 1955; Ghahari & Marusik 2009; Zamani 2016), *L. singoriensis* (Laxmann, 1770), with a Western and Central Palaearctic distribution (Roewer 1955; Ghahari & Marusik 2009; Ghahari & Tabari 2012; Mirshamsi *et al.* 2015; Sadeghi *et al.* 2016), and *L. tarantula*, which has been recorded from Mediterranean, southeastern Europe and Near East (Ghahari & Tabari 2012). The single record of the latter species is definitely based on a misidentification, and most probably belongs to *L. praegrans*. Also, one more species, *L. suzukii* Yaginuma, 1960 has also been recorded from Iran by Goodarzi (1994), although the record was subsequently assigned to *L. praegrans* by Zamani *et al.* (2017). During our surveys of the Iranian spider fauna, we were able to recognize an undescribed species of this genus, which is described and illustrated in this paper.

The following abbreviations are used in the text: a—apical; d—dorsal; p—prolateral; r—retrolateral; v—ventral. Illustrations were made with a grid method, using light microscope MBS-1 after maceration in 20% KOH water solution. Leg and palp segments were measured after their separation from the prosoma. Coloration was described from specimen preserved in 95% ethanol. All measurements are in millimetres. The depositories for the material are the Senckenberg Museum, Frankfurt am Main, Germany (SMF) and National Arachnological Collection, Department of Zoology, V.I. Vernadsky Taurida National University, Simferopol, Ukraine (TNU). Terminology of the morphological features follows Logunov (2010).

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#### *Lycosa aragogi* sp. nov. Figures 1–6.

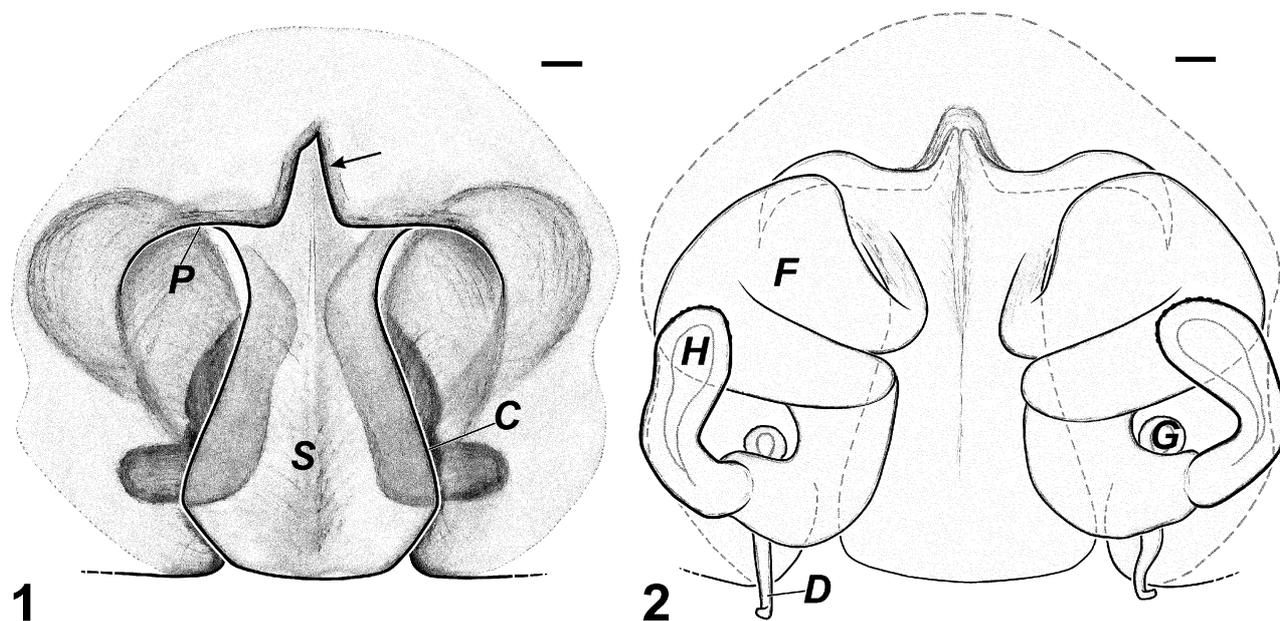
**Type material:** Holotype ♀ (SMF), IRAN: *Kerman Province*: Kerman-Rafsanjan to Zarand pass., alt. 2200–2300m, 26 April 2016 (A.R. Naderi).

**Comparative material:** *Lycosa praegrans*: 1 ♀ (TNU-10048), Crimea, Chernomorskoe Dist., Tarkhankut Peninsula, Kipchak Valley, 45°28'16"N 32°35'36"E, 15 June 2007 (M.M. Kovblyuk); 1 ♂ 1 ♀ (TNU-10047), same locality, 17 June 2007 (M.M. Kovblyuk).

**Etymology.** This species is named after Aragog, the famous fictional spider from “Harry Potter” book series by J.K.

Rowling, in a reference to the similarities between this species and the animatronic puppet version of the character used in the film “Harry Potter and the Chamber of Secrets”, which is actually based on a wolf spider.

**Diagnosis.** *Lycosa aragogi* sp. nov. differs from other species of the genus by having two well-developed anterior epigynal pockets and a deep incision between them (Fig. 1, indicated by arrow).



**FIGURES 1–2.** Epigyne of *Lycosa aragogi* sp. nov., ventral and dorsal. Abbreviations: C—copulatory opening; D—fertilization duct; F—massive fold; G—gland; H—head of spermatheca; P—anterior epigynal pocket; S—septum. Arrow indicates incision between epigynal pockets. Scale bars 0.1 mm.

**Remarks.** According to taxonomic characters for Lycosidae proposed by Zyuzin (1990), *L. aragogi* sp. nov. belongs to subfamily Lycosinae Simon, 1898: this species has large size, high cephalic area of carapace and setae on epigynal septum. Based on the morphology of male copulatory organs, Dondale (1986) divided Lycosinae into *Lycosa* and *Trochosa* groups. A similar subdivision was made by Zyuzin (1990, 1993) based on both male and female morphology. He divided Lycosinae into two tribes: Lycosini Sundevall, 1833, characterised by non-anchor-shaped epigynal septum and Trochosini Zyuzin, 1990, characterised by anchor-shaped epigynal septum. According to this character, *L. aragogi* sp. nov. should belong to the Lycosini. As reported by Dondale (1986), representatives of the *Lycosa* group include *Alopecosa* Simon, 1885, *Arctosa* C.L. Koch, 1847, *Hygrolycosa* Dahl, 1908, *Lycosa*, *Melocosa* Gertsch, 1937 and *Varacosa* Chamberlin & Ivie, 1942. Zyuzin (1993: 699) proposed to include in Lycosini “members of *Lycosa* s.str. with their very peculiar genitalia, and some allied species referred to ‘*Allocosa*’, ‘*Hogna*’ and probably *Metatrochosina* (Roewer, 1959-1960, figs 124, 126, 129, 219, 304-305, 517)”. In general, the structure of vulva of *L. aragogi* sp. nov. is similar to those of *L. praegrans* and *L. tarantula* (Fig. 2; Logunov 2010: fig. 27), by having massive folds (invaginations), which are perhaps copulatory ducts. We placed *L. aragogi* sp. nov. in *Lycosa* on the basis of structures of vulva and shape of septum, which is not anchor-shaped. Still, presence of anterior epigynal pockets distinguishes *L. aragogi* sp. nov. from *L. praegrans* and *L. tarantula*. To our opinion, *L. aragogi* sp. nov. has quite peculiar structure of epigyne and probably should belong to a separate new genus. This problem could be solved after studying the copulatory organs of the males.

**Description.** Total length 26; carapace 11.3 long, 7.5 wide. Carapace with slightly marked gradual descend of thoracic region, eye field not elevated (Fig. 6). Carapace with 2 stripes of black and 3 stripes of white setae, which reach the posterior median eyes (Figs 3, 6). Clypeus with black setae (Fig. 4). Sternum and labium brown, covered with black setae (Fig. 5). Abdomen yellow, covered with series of spots of black and white setae on the dorsum. Venter covered with black setae anteriorly of the epigastric furrow, and with white setae and some spots of black setae posteriorly. Area around spinnerets with black setae. Spinnerets yellow, covered with black setae (Fig. 5). Chelicerae brown, covered with black setae. Basal segment of chelicerae with 3 promarginal and 3 retromarginal teeth. Palps brown with white and black setae; patellae, tibiae and tarsi with dorsal macrosetae. Palp spination: femur d 1-1-2, p 1, r 1; patella p 1; tibia p 2, r 1; tarsus p 2, r 1. Legs brown, with white and black setae. Distal part of femora with a dorsal black setae spot. Patellae with dorsal white setae and ventral and lateral black setae. Metatarsi and tarsi I–II with scopula, I–IV with spinules.

**TABLE 1.** Length of female palps and legs of *Lycosa aragogi*.

	Femur	Patella	Tibia	Metatarsus	Tarsus
Palp	4	2	2	-	3
Leg I	7.4	3.7	5.7	5.6	3.2
Leg II	7.5	4	5.7	5.8	3
Leg III	6.7	3.5	5	6	2.9
Leg IV	8.6	3.8	6.8	8.4	3.6



**FIGURES 3–6.** Live and preserved habitus of the holotype of *Lycosa aragogi* sp. nov.: 3–5 general appearance, dorsal, frontal, and ventral; 6 prosoma, lateral.

**TABLE 2.** Female leg spination of *Lycosa aragogi*.

	Femur	Patella	Tibia	Metatarsus
I	d 1-1, r 2-1-1, p 2.	p 1.	p 1-1, v 2-2-2 (a).	p 1-1, v 2-2-3 (a).
II	d 1-1-1, r 1-1-1, p 1-1-1.	p 1.	p 1-1-1, v 2-2 (a).	p 1-1, v 2-2-3 (a).
III	d 1-1-1, r 1-1-1, p 1-1-1.	p 1, r 1.	d 1-1, p 1-1, r 1-1, v 2-2-2 (a).	p 1-1-1 (a), r 1-1-1 (a), v 2-2-3 (a).
IV	d 1-1-1, r 1, p 1-1.	p 1, r 1.	d 1-1, p 1-1, r 1-1, v 2-2-2 (a).	p 1-1-1 (a), r 1-2-1 (a), v 2-2-3 (a).

Epigyne with two anterior pockets, the edge between the pockets have a deep median incision. Shape of septum is somewhat similar to a conical flask, with an anterior, median furrow. Posterior part of septum with 2 setae. Length of septum more than 1.5 times the width of its posterior part. Spermatheca oval, with numerous pores on the head; a massive fold (unknown function; probably copulatory duct) is situated in front of spermatheca; gland located at base of spermatheca (Figs 1–2).

Male unknown.

**Distribution.** Known from the type locality only.

**Comments.** The habitat was a mountainous area with xerophyte vegetation, mostly consisting of *Astragalus* sp. The specimen was collected from inside its burrow, which was made in a stony slope. Somatic characters (carapace profile, scopula and spinules on legs) of *L. aragogi* sp. nov. are equivalent to structural and functional features of burrowing wolf spiders, as proposed by Zyuzin (1990).

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