

## Description of *Raveniola ambardzumyeni* n. sp. from Armenia (Araneae: Nemesiidae)

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### ABSTRACT

A diagnosis and illustrated description of *Raveniola ambardzumyeni* n. sp. (♀) from Armenia is provided. The new species belongs to the *Raveniola niedermeyeri* species group, where it appears to be most closely related to *R. niedermeyeri* (Brignoli, 1972) itself. *Raveniola ambardzumyeni* n. sp. differs from the latter species in the shape of receptacular branches arising from a narrow common base. The study briefly discusses the relationships and some peculiar characters (including the reduction of the posterior eyes, a triangular apical segment of the posterior lateral spinnerets, and a very specific configuration of the divided three-head spermathecae) of the new species.

KEYWORDS: Aranei, Mygalomorphae, spiders, new species, taxonomy, Caucasus Minor.

### ԱՄՓՈՓՈՒՄ

Հոդվածում տրված է Հայաստանից հայտնաբերված *Raveniola ambardzumyeni* n. sp. (♀) տեսակի դիագնոզը և պատկերագրող նկարագրությունը: Նոր տեսակը պատկանում է *Raveniola niedermeyeri* տեսակների խմբին, և, ըստ ամենայնի, առավել նման է նույնիսկը *R. niedermeyeri* (Brignoli, 1972) տեսակին: *Raveniola ambardzumyeni* n. sp. նոր տեսակը վերջինից տարբերվում է սպերմառնկալիչների ճյուղերի ձևով, որոնք բխում է նեղ ընդհանուր հիմքից: Աշխատանքում համառոտ քննարկվում են նոր տեսակի հարաբերությունները և առանձնահատուկ հատկանիշները (ներառյալ հետին աչքերի կրճատումը, հետին կողային մանող ելունների եռանկյունաձև գազաթային հատվածը և երազլիսանման ճյուղավորվածությամբ սպերմառնկալիչների յուրահատուկ կազմվածքը):

ԲԱՆԱԼԻ ԲԱՌԵՐ: Aranei, Mygalomorphae, սարդեր, նոր տեսակներ, կարգաբանություն, Փոքր Կովկաս:

### INTRODUCTION

*Raveniola* Zonstein, 1987 has hitherto been known as a species-rich mygalomorph genus with 39 species distributed from Turkey to China (WSC 2021). Sixteen of them were recorded from Western Asia in the recent revision of the Middle East species (Zonstein *et al.* 2018), with the following pattern of species numbers (in parentheses) throughout the countries: Turkey (7), Iran (5), Azerbaijan (3), Georgia (3), south Russia (1) and Armenia (1). Most of the species have limited distribution

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and restricted to foothills of the certain mountain ranges. Within the Caucasus, the distribution of five regional species is limited to either the eastern or the western parts of this territory, and a considerable hiatus between these areas is evident (Zonstein *et al.* 2018, figs 218–220). The present study, based on the finding of a new *Raveniola* species in Armenia, is aims to partially fill the above data gap. This new Caucasian representative of the genus is diagnosed, described and illustrated below.

#### MATERIALS AND METHODS

Photographs were taken using an Olympus SZX16 stereomicroscope with a Canon EOS 7D camera, and prepared using the Helicon Focus 7.6.2 Pro (<http://www.heliconsoft.com>). Measurements were taken through the above stereomicroscope to an accuracy of 0.01 mm. All measurements are given in millimetres.

The total body length includes chelicerae but not spinnerets. The diameter of the anterior median eye (AME) is given as the diameter of a sharply edged AME circle (the ‘pupil’). As the AME cornea was well-separated and elevated, and its diameter was measured, the corresponding data follow between brackets. Any eye interdistances counting this parameter are also given between brackets. The length of the sternum was measured along the straight line between the posterior tip of the sternum and the hindmost part of the labium. Lengths of the leg and palp segments were measured on the dorsal side, and lengths of spinneret segments on the ventral side, from the midpoint of the anterior margin to the midpoint of the posterior margin. Spine counts are taken from both sides of the body (from the same segments on the corresponding left and right palp or leg); when they differ, a greater number is given, followed by a lesser number in brackets. For illustration, the dissected vulva was mounted onto a slide with glycerin after maceration in 10 % KOH aqueous solution and after exposure for a few minutes in an alcohol solution of Chlorazol Black.

The following abbreviations are used: ALE – anterior lateral eye(s), AME – anterior median eye(s), d – dorsal, p – prolateral, pd – prodorsal, pv – proventral, PLE – posterior lateral eye(s), PLS – posterior lateral spinneret(s), PME – median lateral eye(s), PMS – posterior median spinneret(s), r – retrolateral, rd – retrodorsal, rv – retroventral, v – ventral.

The holotype and the only paratype of the new species are deposited in the Zoological Museum, Moscow University, Russia (ZMMU).

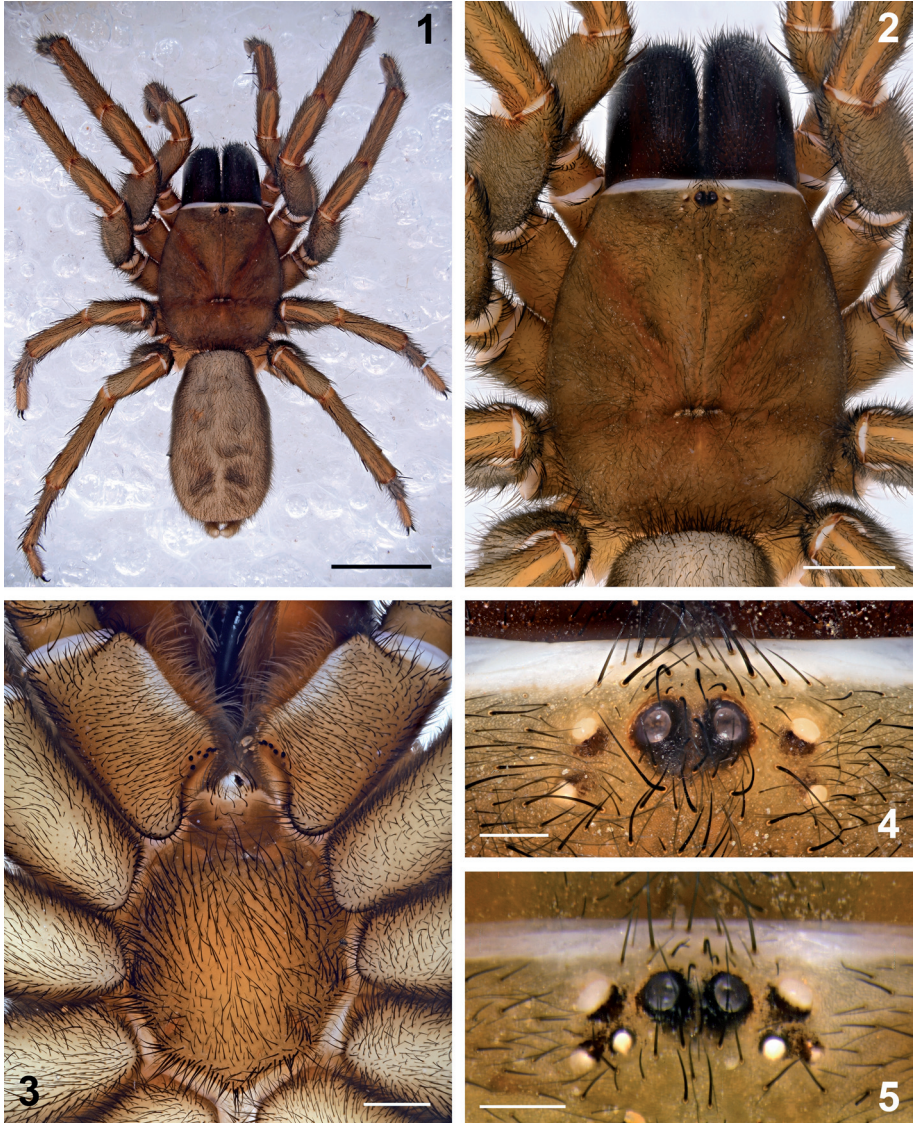
#### TAXONOMY

Family Nemesiidae Simon, 1889

Genus *Raveniola* Zonstein, 1987

The number of species assigned to the genus rises to 40 according to the below data. Six of these occur in the Caucasian region: *R. adjarica* Zonstein, Kunt & Yağmur, 2018 (♂♀, Georgia); *R. ambardzumyani* n. sp. (♀, Armenia); *R. dunini* Zonstein, Kunt & Yağmur, 2018 (♂♀, Armenia, Azerbaijan); *R. hyrcanica* Dunin,

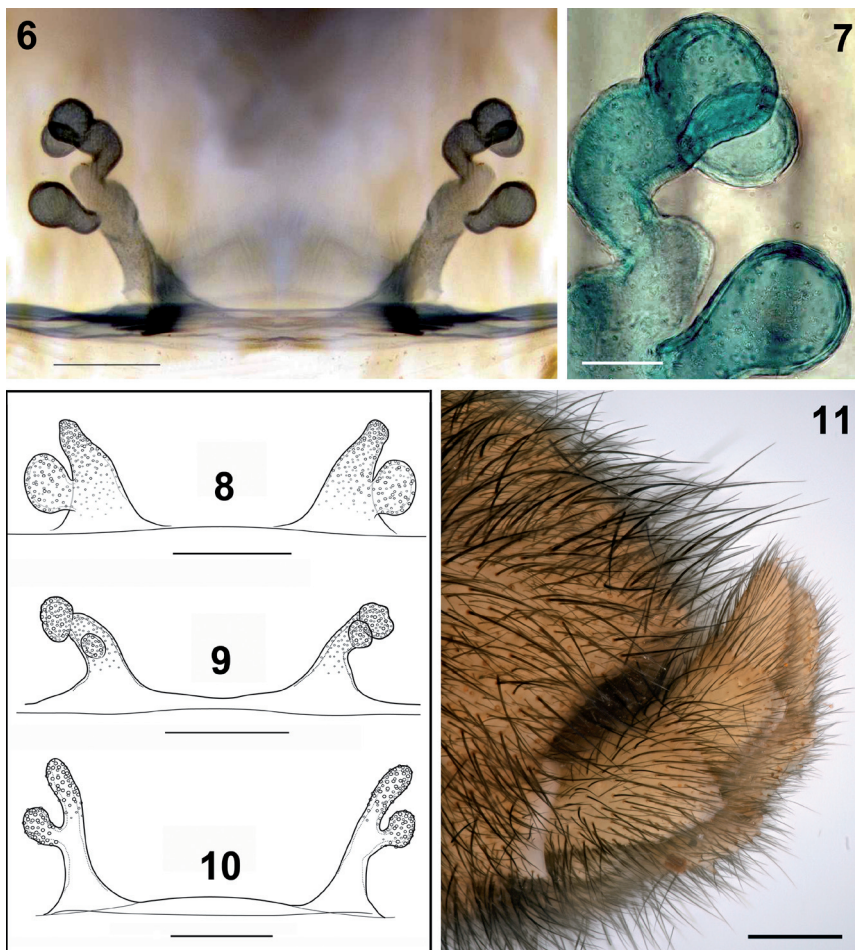
1988 (♂♀, Azerbaijan); *R. pontica* (Spassky, 1937) (♂♀, Georgia, Russia) and *R. zaitzevi* (Charitonov, 1948) (♂♀, Azerbaijan, Georgia).



**Figs 1–5:** *Raveniola ambardzumyani* n. sp., holotype female (1–4) and paratype juvenile (5): (1) habitus, dorsal; (2, 3) cephalothorax, dorsal and ventral, respectively; (4, 5) eye group, dorsal. Scale bars: Fig. 1 = 5 mm, Fig. 2 = 2 mm, Fig. 3 = 1 mm, Figs 4, 5 = 0.25 mm.

*Raveniola ambardzumyani* n. sp.

(Figs 1–7, 11)

**LSID:** urn:lsid:zoobank.org:act:E44C3C21-E8C5-4968-A5BB-D39F076B15BC.**Etymology:** The species is named in honour of Vartan Zh. Ambardzumyan (Yerevan, Armenia), who helped to arrange an expedition, during which the type series was collected.**Diagnosis:** The structure of the spermathecae in the new species somewhat resembles that in *R. zaitzevi* (Charitonov, 1948), and is more similar to their structure

**Figs 6–11:** *Raveniola* spp.: (6) *R. ambardzumyani* n. sp., holotype, vulva, dorsal (inside); (7) same, enlarged; (8) same, *R. zaitzevi* (Charitonov, 1948); (9) same, *R. niedermeyeri* (Brignoli, 1972); (10) same, *R. vonwicki* Zonstein, 2000; (11) *R. ambardzumyani* n. sp., holotype, spinnerets, lateral. Scale bars: Figs 6, 8–10 = 0.25 mm, Fig. 7 = 0.1 mm, Fig. 3 = 0.5 mm.

in *R. niedermeyeri* (Brignoli, 1972) and *R. vonwicki* Zonstein, 2000. The new species can be distinguished from all three in the shape of their three-head receptacular branches arising from a narrow common base (Figs 6, 7 cf. Figs 8–10).

**Description: Female** (holotype). Total length 17.8. Habitus as in Fig. 1.

*Colour* (in alcohol): Carapace, palps and legs light to medium ginger brown; eye tubercle not darkened, eyes are encircled each with obscure brownish area; chelicerae dorsally dark chestnut brown, ventrally dark orange; venter brownish orange (sternum and labium darker, maxillae lighter, coxae I–IV even paler), abdomen dorsally medium brownish grey with slighter darker and poorly distinct brownish chevron-like pattern; ventral part abdomen and spinnerets light yellowish brown.

*Cephalothorax* dorsally and ventrally as in Figs 2 and 3, respectively. Carapace 7.01 long, 6.05 wide. Cephalic region slightly elevated over thoracic portion of carapace; thoracic fovea nearly straight. Clypeus narrow, equal in length to AME diameter. Eye tubercle weakly developed with slightly raised AME (Fig. 4). Eye diameter and interdistances: AME 0.14(0.20), ALE 0.12, PLE 0.08, PME absent, AME–AME 0.16(0.10), AME–ALE 0.19(0.16), ALE–PLE 0.17, PLE–PLE 0.91. Chelicerae without rastellum. Cheliceral furrow with 10 promarginal teeth and 10–11 uniformly very small mesobasal denticles. Labium 0.71 long, 1.25 wide. Sternum 3.29 long, 2.98 wide. Maxillae each with 5–6 large cuspules along probasal heel.

*Palp and legs*: Spines (all femora with 3–5 thin and long dorsal spines alongside midline; palpal patella, patellae I–II and tarsi I–IV aspinose): Palp: femur pd1; tibia p1–1, v3(2)–3(2)–3; tarsus v3–1–2. Leg I: femur pd1; tibia p1–0, v2(1)–1–2(1)–3; metatarsus v2–2(0)–1–2. Leg II: femur pd1–1; tibia p0–1, v3(2)–1–1–3; metatarsus v2–2–2. Leg III: femur pd1–1, rd1–1; patella p1, r1; tibia d1–0, p1–1, r1–1, v2–2–3; metatarsus p1–1–1, pd1–1–1, r1–1, rd1–1–1, v2–2–3. Leg IV: femur pd0–0–1, rd0–0–1; patella p1, r1; tibia d1–0–0, p0–1–1, r1–1–1, v2–2–3; metatarsus d0–1–0, p1–1–1, r1–1–1–1, v2–1–2–3. Trichobothria: 2 rows of 9–11 each on tibiae, 13–15 on metatarsi, 13–14 on tarsi, 10 on palpal tarsus. Scopula entire and distal on metatarsi I–II, entire on palpal tarsus, narrowly divided on tarsus I, widely divided on tarsus II, very widely divided and mixed with setae on tarsus III, absent on tarsus IV. Paired claws on tarsi I–IV with 7–8 teeth on each margin. Palpal claw with 4 promarginal teeth. Leg measurements:

	Palp	I	II	III	IV
Femur	4.14	5.53	5.09	4.35	5.82
Patella	2.36	3.43	2.94	2.52	2.92
Tibia	2.96	4.59	4.20	3.36	5.11
Metatarsus	—	3.67	3.38	4.37	6.82
Tarsus	2.53	2.34	2.28	2.38	2.88
Total	11.99	19.56	17.89	16.98	23.55

*Spermathecae* (Figs 6, 7): Receptacle with 2 branches, more proximal branch located at about  $\frac{1}{3}$  distal part with distinct stalk and globular head; distal branch located at anterior tip of the stalk and composed of 2 globular heads; all heads of about same size, as wide as stalk; receptacles spaced by about length of stalk.

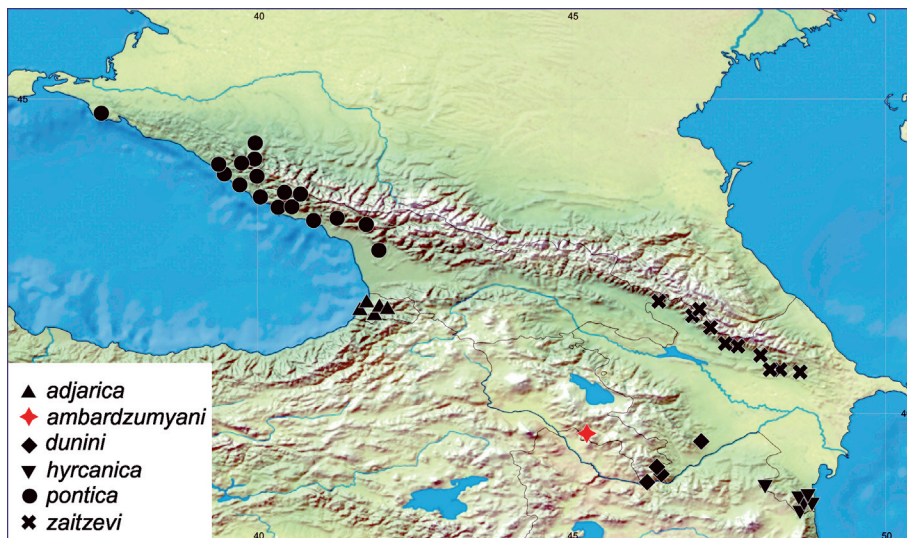


Fig. 12: Records of *Raveniola* spp. in the Caucasus.

*Spinnerets* (Fig. 11): PMS: length 0.48, diameter 0.18. PLS: maximal diameter 0.72; length of basal, medial and apical segments 0.97, 0.63, 0.64; total length 2.24; apical segment triangular.

**Male.** Unknown.

**Holotype:** ♀ **Armenia:** *Vayot Dzor Province:* Gnishik River Canyon, road to Noravank Monastery, 39°41'14"S 45°13'21"E, 1400 m, 10.v.2021, Y.M. Marusik (ZMMU).

**Paratype:** 1 juv., collected together with the holotype (ZMMU).

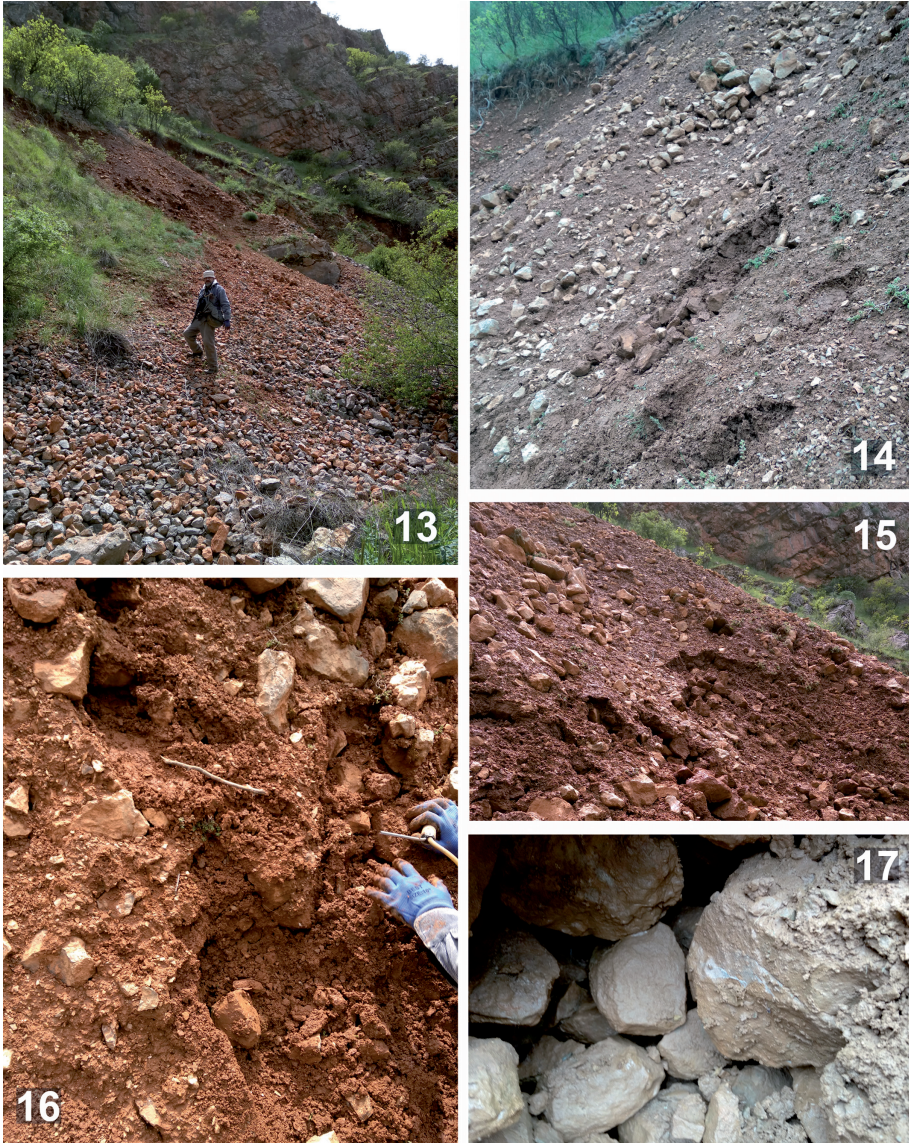
**Distribution:** The species is known only from the type locality (Fig. 12).

**Comments:** In the holotype, the PME pair is completely lacking, and the spider is in fact six-eyed, while the paratype juvenile has a normally looking pair of small PME (Fig. 4 cf. Fig. 5).

**Ecology:** The type series was collected in the midland mountain zone, on open clay slope with embedded small stones (Figs 13–17). That appears to be unusual for *Raveniola* occurring in the Caucasus (the previously known Caucasian species were collected from more mesophilic biotopes; see Zonstein *et al.* 2018). Spiders were found dwelling in cavities among stones. This slope was inhabited by small pholcids, belonging to a seemingly new to science species of *Spermophora* Hentz, 1841. They also were found dwelling along those cavities.

## DISCUSSION

Since description, the genus has been divided into several species groups (see Zonstein 2009; Zonstein *et al.* 2018) based mostly on the similarities and differences in the structure of the copulatory organs in males and females. Two of these



**Figs 13–17:** Collecting habitat of *Raveniola ambardzumyani* n. sp.: (13) clay slope with stones; (14, 15) same, close up, showing pit excavated during collecting *Raveniola* and *Spermophora*; (16, 17) cavities between stones from where new *Raveniola* was collected.

groups have been recorded within the Caucasus: *Raveniola hyrcanica* group, including *R. adjarica*, *R. dunini*, *R. hyrcanica* and *R. pontica* (i.e., four of five group members), and *Raveniola niedermeyeri* group, with *R. zaitzevi*, the only Caucasian

representative of this group that otherwise comprises also five species. The third Western Asian species group of the genus, based on *R. micropa* (Ausserer, 1871) and including six species, is hitherto known only from Turkey.

Although the male characters of *R. ambardzumyani* n. sp. remain unknown, structure of the vulva in this species (particularly, the shape of relatively narrow receptacular bases) indicates that it belongs to the *Raveniola niedermeyeri* species group. Among five other group-mates, three species (*R. niedermeyeri*, *R. vonwicki* and *R. zaitzevi*) are known from both sexes, while *R. mazandaranica* Marusik, Zamani & Mirshamsi, 2014 and *R. marusiki* Zonstein, Kunt & Yağmur, 2018 are currently known only from males.

Within the group, the new species appears to be most closely related to the Iranian *R. niedermeyeri*. In addition to the similarity in the structure of the female copulatory organs (Figs 6 and 9), both species share some characters such as a triangular posterior segment of the PLS and a relatively small number of the maxillary cuspules (Fig. 3 cf. Zonstein & Marusik 2010, fig. 3). Females of *R. vonwicki* and *R. zaitzevi* differ from the new species in a greater degree: *R. vonwicki* possesses a considerably longer apical segment of the PLS (cf. Zonstein *et al.* 2018, fig. 67) and *R. zaitzevi* differs from *R. ambardzumyani* n. sp. in shape of the spermathecae (Fig. 6 cf. Fig. 8). Finally, *R. mazandaranica* and *R. marusiki*, whose conspecific females remain unknown, may be clearly distinguished from the new species by the structure of the eye group (see below).

An interesting peculiarity of *Raveniola ambardzumyani* n. sp. is such strong a reduction of the posterior eyes (equally PLE and PME) that the latter eye pair is absent in the holotype (their full absence may represent a particular case or to be a result of the developmental fault). In both the holotype and paratype, the AME are considerably larger than other eyes (Figs 4, 5). Generally, *Raveniola* spp. possess a normally developed eye group with the AME smaller than ALE. The only exception is the eyeless *R. beelzebub* Lin & Li, 2020; however, this species is a troglobitic mygalomorph (Lin & Li 2020), while *R. ambardzumyani* n. sp., like most its congeners, is a burrowing species.

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