

Description of a new *Aelurillus* species from Khorasan province of Iran, with comments on *A. concolor* Kulczyński, 1901 (Araneae: Salticidae)

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A new species *Aelurillus khorasanicus* sp.n. (♂♀) is described from north-east Iran. *Aelurillus muganicus* Dunin, 1984 is synonymised with *A. concolor* Kulczyński, 1901. A distribution map of the two species is provided.

Keywords: Salticidae, *Aelurillus*, Iran, Khorasan, new species, new synonymy.

Introduction

A total of 72 valid species of *Aelurillus* Simon, 1884 has been described in the world fauna to date (Platnick, 2014), the majority of which occurs in the territory of Ancient Mediterranean (*sensu* Kryzhanovskij, 2002). Males in this genus, as well as those of many other representatives of the subfamily Aelurillinae (*sensu* Prószyński, 2013), are characterised by a rather complex conformation of their embolic division which is usually hidden in the deep ‘cymbial pocket’ (Logunov, 1999). This is why their identification always requires a dissection of the male palp. The structure of embolic division together with the hair colouration of the clypeus, chelicerae, palps and the first pair of legs provide a reliable set of characters for distinguishing *Aelurillus* species.

At present, only three *Aelurillus* species have been recorded from Iran: *A. concolor* Kulczyński, 1901, *A. marusiki* Azarkina, 2002 and *A. unitibialis* Azarkina, 2002 (Azarkina, 2002; Logunov *et al.*, 2002), in contrast to the twelve species known from the neighbouring territories of Turkmenistan, Afghanistan and Pakistan. Azarkina (2002, 2003, 2006) described half of these species over the last decade. Overall, the salticid fauna of Iran remains poorly documented (Azarkina, 2002, Logunov, Marusik, & Mozaffarian 2002; Logunov, Vazirianzadeh, Moravvey, & Navidpour, 2006; Logunov, 2007, 2009); see Logunov (2010) for a discussion.

Here we provide a redescription of *A. concolor* identify a synonymy, and describe a new *Aelurillus* species from Khorasan Province.

Material and methods

This paper is based on type and comparative material borrowed from the following museums and personal collections:

DBUL = University of Ljubljana, Slovenia (C. Fišer); HECO = Hope Entomological Collection, Oxford, UK (J. Hogan); ISEA = Institute of Systematics and Ecology of Animals, SB RAS, Russia (G.N. Azarkina); IZWP = Institute of Zoology, Warsaw, Poland (T. Huflejt); MMUM = Manchester Museum, University of Manchester, Manchester, UK (D.V. Logunov); NHM = Natural History Museum, Vienna, Austria (J. Gruber); NNM = National Museum Netherlands, Leiden, the Netherlands (K. van Dorp); PCARS = Personal collection of A. Russell-Smith (Sittingbourne,

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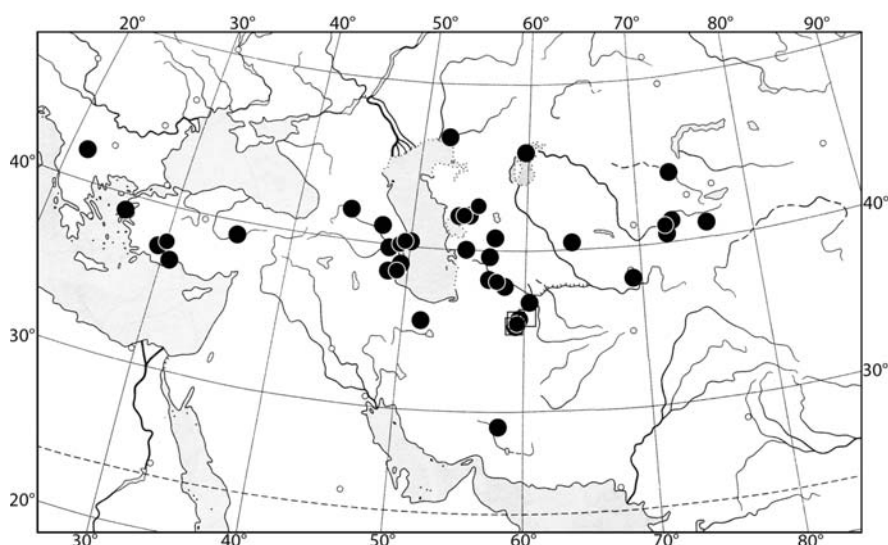


Figure 1. Distribution records of *Aelurillus concolor* (circle) and *A. khorasanicus* (square).

UK); PCSD= Personal collection of R. Snazell (Dorset, Swanage, UK); SNHM = Senckenberg Natural History Museum, Frankfurt am Main, Germany (P. Jäger); ZISP = Zoological Institute, Saint Petersburg, Russia (V.A. Krivokhatsky); ZMFUM = Zoological Museum, Ferdowsi University of Mashhad, Mashhad, Iran (O. Mirshamsi); ZMMU = Zoological Museum of the Moscow State University, Moscow, Russia (K.G. Mikhailov).

A total of 74 specimens of two species were examined. Specimens were studied in ethanol and their colouration refers to that of preserved specimens. All drawings were done with the aid of a reticular eyepiece attached to MBS-10 stereomicroscope. Digital images were taken with a Zeiss stereomicroscope Stemi 2000 and stack images were combined using the Helicon Focus software.

The drawings were edited with Adobe Photoshop. Where locality co-ordinates were not provided on specimen labels or were not available in the institutional databases, they were traced using Google Maps and old topographic maps. Abbreviations used in the text: AME, anterior median eyes; Fm, femur; Pt, patella; Tb, tibia; Mt, metatarsus. The sequence of leg segments in measurement data is as follows: femur + patella + tibia + metatarsus + tarsus. All measurements are in mm. Leg spination follows Ono (1988).

Species accounts

Aelurillus concolor Kulczyński, 1901 (Figures 1–33)

Aelurillus concolor Kulczyński, 1901: 319, 349, Tab. 13, Fig. 18 (♀ syntypes from the IZWP, subadult ♀ examined, adult ♀ probably lost).

Aelurillus concolor: Wesołowska, 1996: 21–23, Figs 2–3.

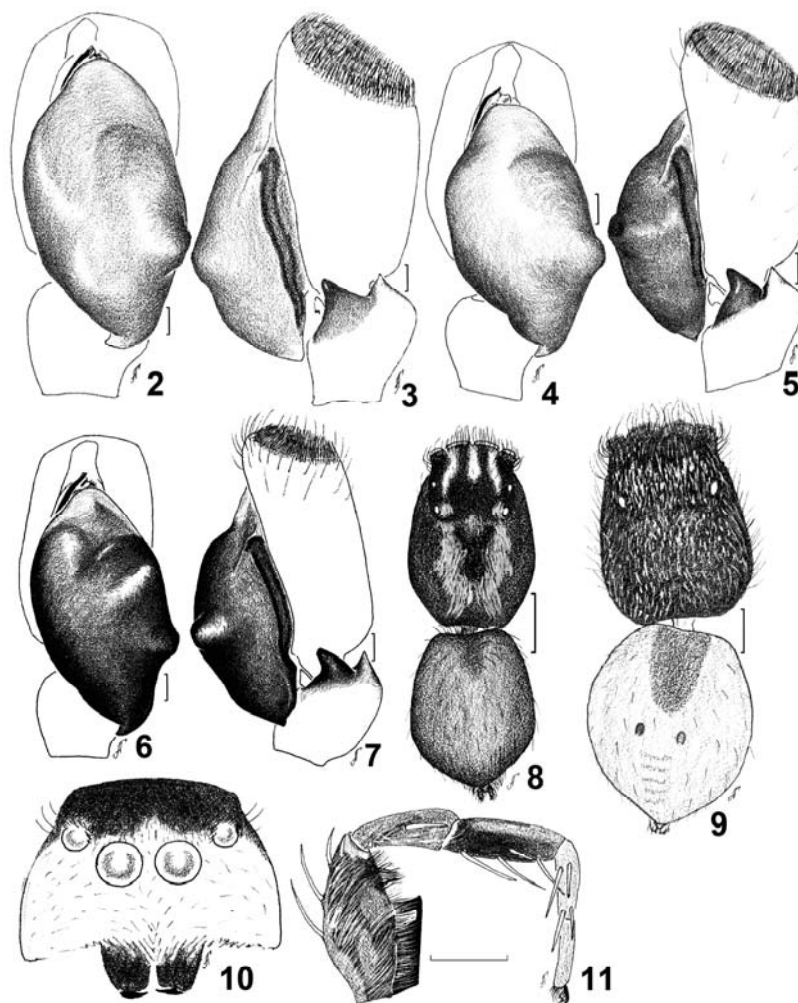
Hemsenattus iranus Roewer, 1959: 778–779, Figs 26, 27 (♂ lectotype from the SNHM, examined). Synonymised with *A. concolor* by Nenilin (1984).

Aelurillus iranus: Prószyński, 1966: 464–467, Figs 1–4.

Aelurillus muganicus Dunin, 1984: 50, Figs 12, 13 a–b (♂♀, ♀ holotype from ZMMU, examined). **Syn. n.**

A. muganicus: Azarkina, 2003: 103–105, Figs 64–76; Russell-Smith et al., 2011: 152.

Aelurillus azerbaijdzanicus Dunin, 1984: 51, Fig. 11 (♀ holotype from ZMMU, examined). Synonymised with *A. muganicus* by Azarkina (2003).



Figures 2–11. Habitus and palp of *Aelurillus concolor* (2-3 – holotype of *Hemsennattus iramus*; 4-5, 9-11 – male from Firyuza, Turkmenistan; 6-8 – paratype of *A. muganicus*). 2, 4, 6 – palp, ventral view; 3, 5, 7 – ditto, retrolateral; 8, 9 – dorsal, males; 10 – male's face; 11 – first leg, prolateral. Scales: 2-7 – 0.1 mm, 8-9 – 1 mm, 11 – 0.5 mm.

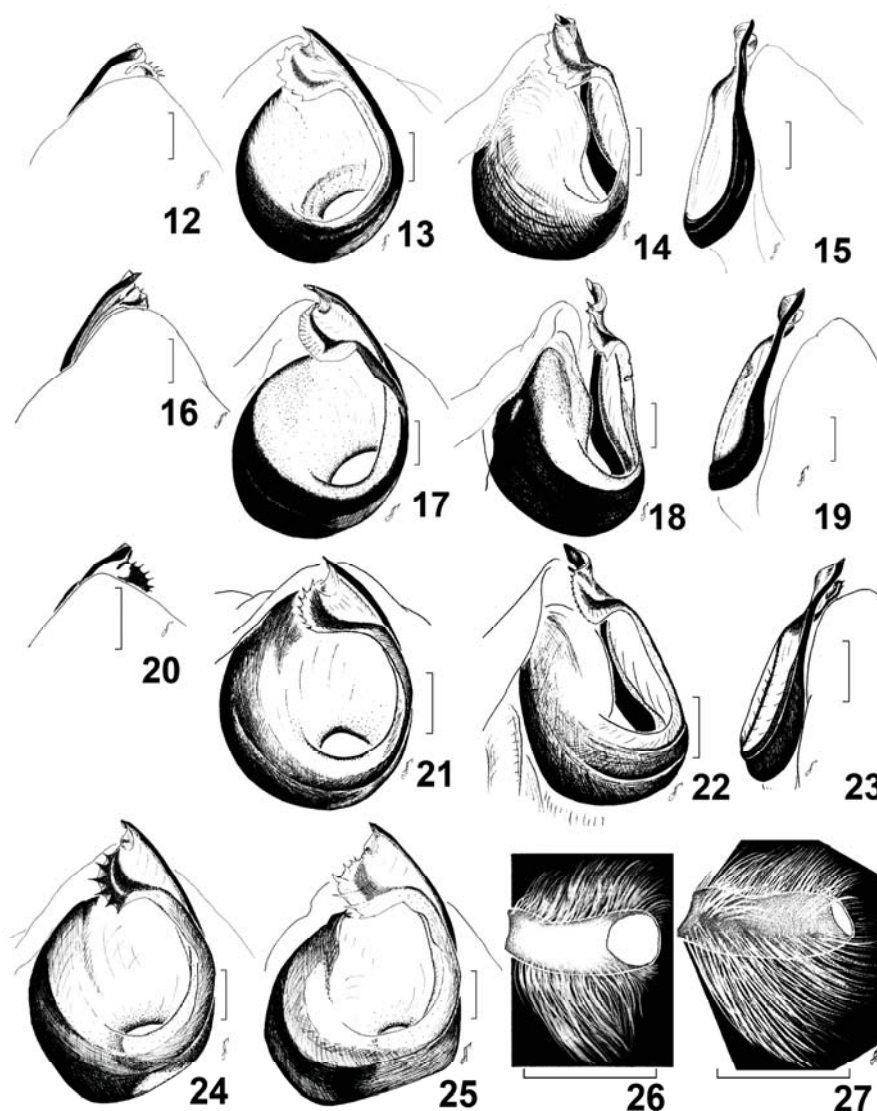
Type material. *Aelurillus concolor* Kulczyński, 1901. Syntype 1 sbad. ♀ (IZWP #46/514) Gruzja, Tbilisi, «Skt. Davidberg» [Georgia, St. David Mount, c. 41°43'N, 44°48'E], 25.iii.-15.iv.1898 (E. Csiki). – *Hemsennattus iramus* Lectotype ♂, paralectotype 1 ♂ (SNHM #1145) Iran, 100 km südl. Sabzawaran [=Sabzāwārān, =Jiroft], c. 28°40'N, 57°44'E, Arachn. Coll. Rwr. – Lfd. № 11461, Araneae, Salticidae, date unknown (J. Hemsenn). – *Aelurillus muganicus* Dunin, 1984. Holotype ♀ (ZMMU) Azerbaijan, Sabirabad Rayonu, Pokrovka, c. 39°58'N, 48°36'E, 10.ix.1973 (P. M. Dunin); Paratypes: 1 ♀ (ZMMU) Azerbaijan, Apsheron [=Absheron] Peninsula, Glinyanyi [=Gil] Island, opposite to Alat, c. 39°57'N, 49°29'E, 15.vii.1979 (P.M. Dunin); 4 ♂ (ZMMU) Azerbaijan, Apsheron Peninsula, Baku [=Bakı], Bina, c. 40°27'N, 50°05'E, 3.x.1973 (P.M. Dunin). – *Aelurillus azerbaijdzanicus* Dunin, 1984 Holotype ♀ (ZMMU) Azerbaijan, Apsheron Peninsula, nr. Baku [=Bakı], Zığ, c. 40°22'N, 49°58'E, 8.vi.1979 (P. M. Dunin); Paratypes: 1 ♀ (ZMMU) together with the holotype; 1 ♀ (ZMMU) Azerbaijan, Apsheron Peninsula, 21.v.1977 (P. M. Dunin).

Material: *Iran:* 2♂ (ISEA #001.6465) Khūzestān Province, c. 31°49'N, 49°52'E, 18.xi.2006 (Shirsian); 1♀ (ZISP) Tehran, c. 35°40'N, 51°25'E, iv.1859 (collector unknown); 1♂ (ZMFUM #6) Khorasan Province, c. 17 km NW of Mashhad, Tous, 36°28'N, 59°30'E, 1004 m a.s.l., 23.iv.2012 (S. Musavi); 1♀ (ZMFUM #10) Khorasan Province, Mashhad, Jim Abad, 36°04'N, 59°45'E, 995 m a.s.l., 24.iii.2012 (S. Musavi); 1♂ (MMUM G7545.1) Khorasan Province, Mashhad, Sang Bast, 35°58'N, 59°45'E, 1110 m a.s.l., 3.v.2012 (S. Musavi).

Diagnosis. This species is similar to *A. conveniens* (O.P.-Cambridge, 1872), but is distinguished from it by the presence of dense white hairs on the clypeus and “cheeks” (Figure 10) and long and dense white hairs on male palpal femora (Figures 26–27). Femur I of *A. concolor* possesses two bunches of dark brown hairs ventrally (Figure 11), whereas that of *A. conveniens* is covered with white hairs.

Description. Male (from Turkmenistan: Gaňňaly): Carapace 3.00 long, 2.10 wide, 1.40 high at PLE. Ocular area 1.10 long, 1.40-1.50 wide anteriorly and 1.30-1.45 wide posteriorly. Diameter of AME 0.45. Abdomen 2.10 long, 2.10 wide. Cheliceral length 0.80. Clypeal height 0.25-0.30. Length of leg segments: I 1.50+0.90+1.00+0.70+0.50; II 1.40+0.80+0.90+0.70+0.60; III 1.90+1.00+1.00+1.30+0.65; IV 1.70+0.80+1.20+1.40+0.75. Leg spination: I: Fmd 1-1-5; Ptprandrt 1; Ti d 1-0-0, pr 1-1-1, rt 0-1-0, v 2-2-2 ap; Mt pr and rt 1-1, v 2-2 ap. II: Fm d 1-2-5; Pt pr and rt 1; Ti d 1-0-0, pr 1-1-1, rt 0-1 or 1-1-0, v 1-1-2 ap; Mt pr and rt 1-1, v 2-2 ap. III: Fm d 1-3-5; Pt pr and rt 1; Ti d 1-0-0, pr and rt 1-1-1-1, v 1-0-2 ap; Mt d 1-1-0, pr and rt 1-0-2, v 1-1-2 ap; IV: Fm d 1-2-5; Pt pr and rt 1; Ti d 1-0-0, pr and rt 1-1-1-1, v 1-0-2 ap; Mt d 1-1-0, pr 1-1-2, rt 1-0-2, v 1-1-2 ap. Colouration: Carapace brown to dark brown, with black ocular area, covered with dark and white adpressed scales forming a broad white band, which is poorly marked in some specimens. Ocular area with or without three white short stripes (Figures 8–9). Clypeus and “cheeks” dark brown, covered with white more or less dense hairs (Figure 10). Sternum dark brown. Chelicerae dark brown. Abdomen grey-yellow to grey-brown. Dorsum dark brown, without a pattern, covered with dense yellow-white scales and black and white hairs. Book-lungs and spinnerets brownish grey. Legs yellow to yellow-brown, with brown patches and semi-rings. Femora I and II with retrolateral brown patch and ventro-apical row of black bristles (Figure 11). Palps yellow. Palpal femora without ventral knob, covered with long and dense white or yellow-white hairs (Figures 26–27). Palpal structure as in Figures 2–7 and 12–25.

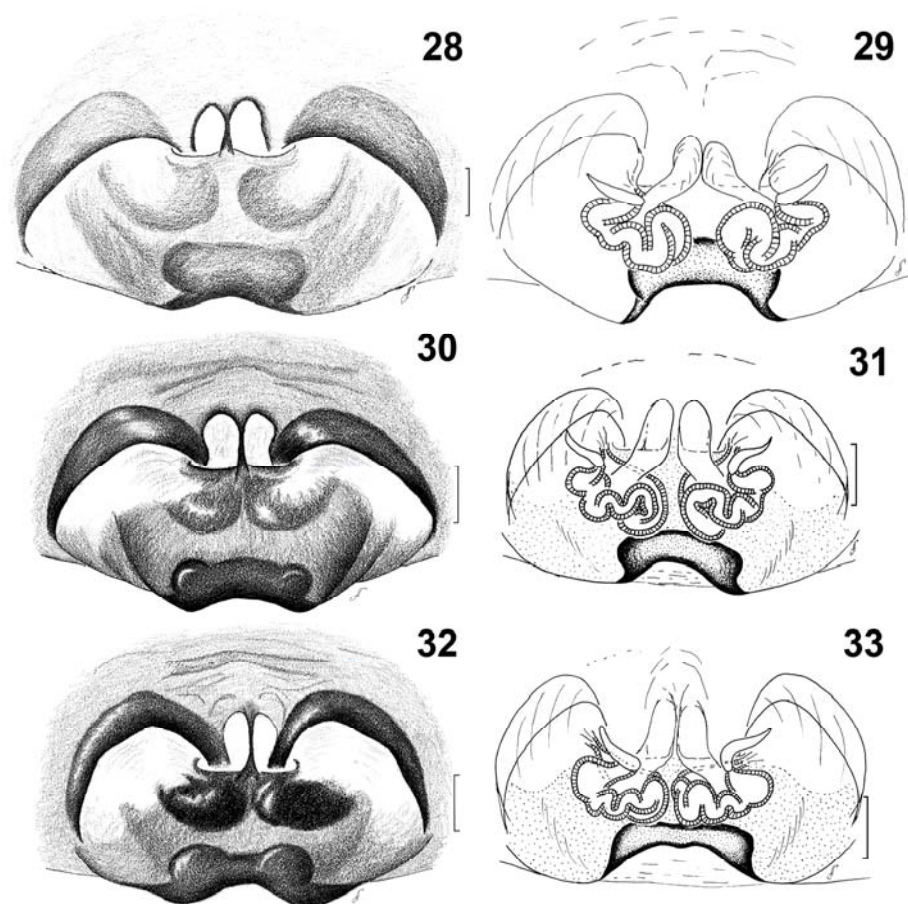
Female (from Turkmenistan: Gaňňaly): Carapace 3.3-3.7 long, 2.50-2.60 wide, 1.50-1.80 high at PLE. Ocular area 1.30-1.40 long, 1.70-1.85 wide anteriorly and 1.60-1.80 wide posteriorly. Diameter of AME 0.50. Abdomen 4.10-4.40 long, 3.00-3.40 wide. Cheliceral length 1.00. Clypeal height 0.30. Length of leg segments: I 1.60+1.10+1.00+0.70+0.65; II 1.70+1.10+1.00+0.75+0.70; III 2.30+1.30+1.30+1.50+ 0.80; IV 2.10+1.05+1.40+1.80+0.90. Leg spination: I: Fm d 1-1-4; Tb pr 1-1 or 0-0, v 2-2-2 ap; Mt pr 1-1 ap, v 2-2 ap. II: Fm d 1-2-4; Tb pr 0-1, v 1-1-2 ap or 1-2-2 ap; Mt pr and rt 1-1 ap, v 2-2 ap. III: Fm d 1-2-4 or 1-3-5; Pt pr and rt 1; Tb d 1-0-0, pr and rt 1-1-1, v 1-0-2 ap; Mt d 1-1-0, pr and rt 1-0-2 ap, v 1-1-2 ap. IV: Fm d 1-1-2 or 1-1-3; Pt pr and rt 1; Tb d 1-0-0, pr and rt 1-1-1, v 1-0-2 ap; Mt d 1-1-0, pr 1-1-2 ap, rt 1-0-2 ap, v 1-1-2 ap. Colouration: Carapace dark brown, with black ocular area, covered with white adpressed scales. Clypeus and “cheeks” brown, covered with white hairs. Sternum grey-yellow. Chelicerae dark brown. Abdomen grey-yellow or brownish-grey. Dorsum without pattern or with mottled pattern (poorly distinguishable in some specimens). Book-lungs yellow or grey. Spinnerets brown. Legs yellow or brown-yellow, with brown patches and semi-rings. Palps yellow, covered with white hairs. Structure of epigyne and vulva as in Figures 28–33.



Figures 12–27. Embolic division and palpal femur of *Aelurillus concolor* (12–15 – holotype of *Hemsenattus iranus*; 16–19, 25 – male from Firyuza, Turkmenistan; 20–23 – paratype of *A. muganicus*; 24 – male from Jalal-Abad, Kyrgyzstan). 12, 16, 20 – embolic division, ventral view; 13, 17, 21, 24–25 – ditto, dorsal; 14, 18, 22 – ditto, retrolateral; 15, 19, 23 – ditto, prolateral; 26 – palpal femur, ventral; 27 – ditto, retrolateral. Scales: 12–25 – 0.1 mm, 26–27 – 0.5 mm.

Distribution. From Greece in the west to Kyrgyzstan on the east and Kerman Province, Iran on the south-east (Figure 1).

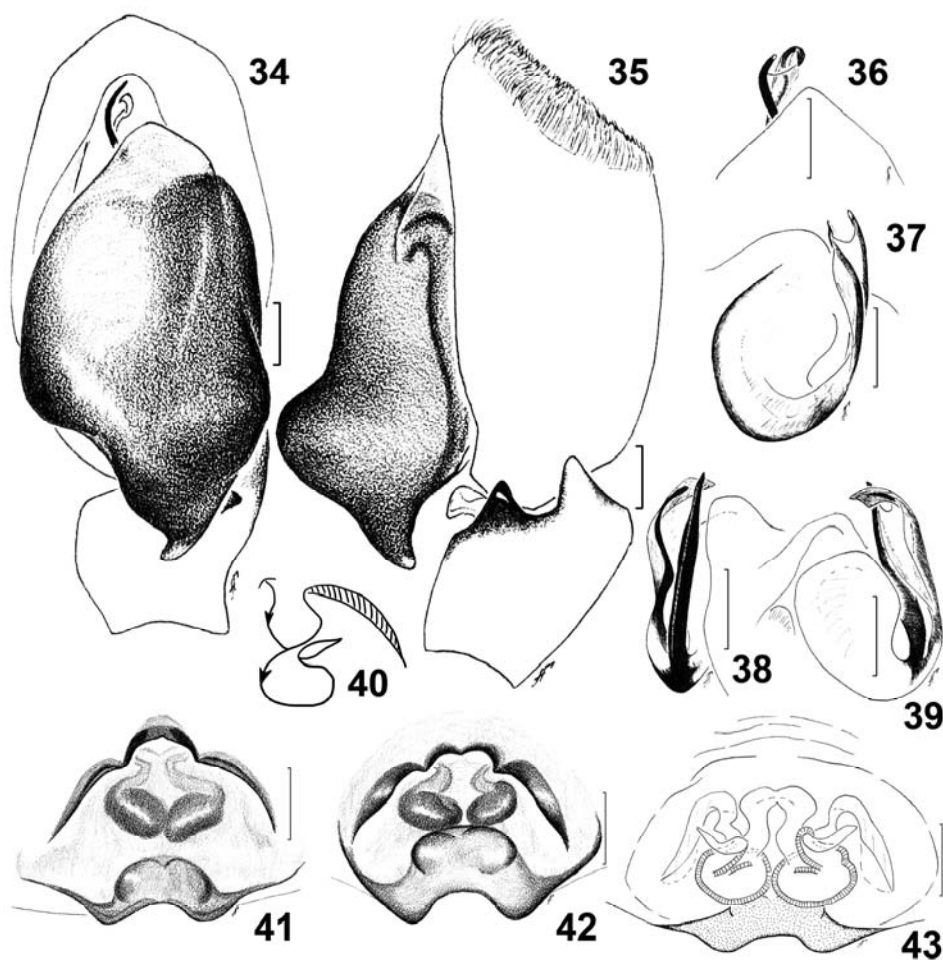
Comments. Body colouration of this species strongly varies, even between the specimens within the same population, e.g. three coloured stripes on the eye field of males can present or absent. The body size also varies considerably, e.g. specimens from Azerbaijan are smaller than others. Yet, the structure of male palp also varies to a large



Figures 28–33. Epigyne and vulva of *Aelurillus concolor* (28–29 –from Turkey; 30–31 – paratype of *A. muganicus*; 32–33 – paratype of *A. azerbaijanicus*). 28, 30, 32 – epigyne, ventral view; 29, 31, 33 – vulva, dorsal. Scales: 0.1 mm.

extent (cf. Figures 17, 25 and Azarkina, 2003, p. 103). Therefore it is safe to conclude that the name *A. muganicus*, given to the population of slightly smaller specimens from Azerbaijan, should be considered a junior synonym of *A. concolor*.

Species determinations in the genus *Aelurillus* is often difficult due to the interspecific similarity of the copulatory organs between species, especially in the species group *aeruginosus*, to which *A. concolor* belongs. Therefore, besides the structure of the copulatory organs hair colouration on the clypeus, palpal femora and the first pair of legs are also important reliable determinations. Strong intraspecific variation of the copulatory organs is a common phenomenon among *Aelurillus* species, for instance, in the *luctuosus* species group (see Azarkina & Logunov, 2006). Males in this group can be reliably distinguished by the colour pattern of the clypeus.

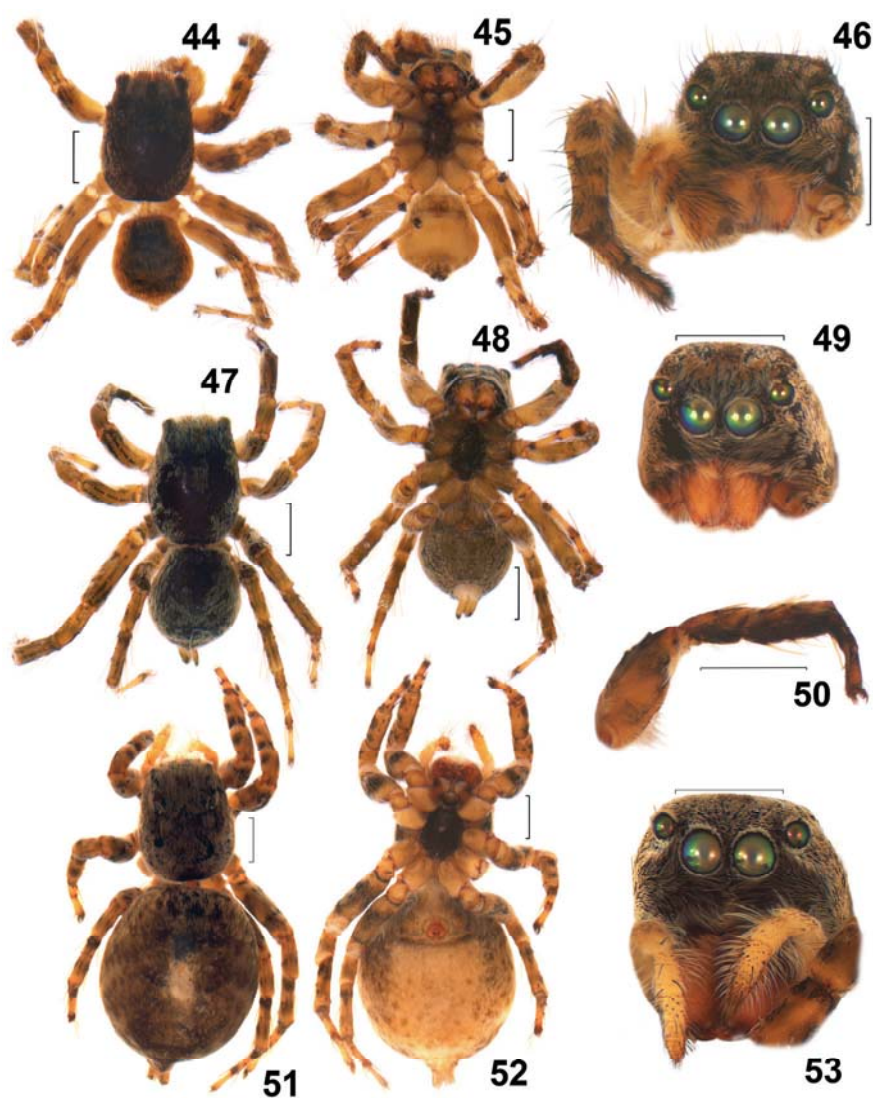


Figures 34–43. Copulatory organs of *Aelurillus khorasanicus* sp.n. (paratype) 34 – palp, ventral view; 35 – ditto, retrolateral; 36 – embolic division, ventral; 37 – ditto, dorsal; 38 – ditto, prolateral view; 39 – ditto, retrolateral; 40 – schematic course of insemination ducts; 41–42 – epigynes, ventral; 43 – vulva, dorsal. Scales: 0.1 mm.

***Aelurillus khorasanicus* sp.n.** (Figures 1, 34–53)

Type material. Holotype ♂ (MMUM G7545.2) Khorasan province, Sarakhs, Bazangan, 36°18'N, 60°28'E, 861 m a.s.l., 18.vi.2012 (S. Musavi). Paratypes: 1♂ 1♀ (SZM 000.850) Khorasan Province, c. 17 km NW of Mashhad, Tous, 36°28'N, 59°30'E, 1004 m a.s.l., 23.iv.2012 (S. Musavi); 1♀ (ZMFUM #7, intact ♀), 1♀ (MMUM G7545.3, epigyne removed) Khorasan Province, Mashhad, Shandiz, 36°23'N, 59°17'E, 1383 m a.s.l., 7.iv.2012 (S. Musavi).

Diagnosis. The new species resemble *A. galinae* Wesolowska & van Harten, 2010 in size and colour pattern of the eye field, however, *A. khorasanicus* sp.n. is darker (cf. Wesolowska & van Harten, 2010, Plates 1–4). The embolar division of *A. khorasanicus* sp.n. resembles that of *A. v-insignitus* (Clerck, 1757), but differs in having the more bent terminal apophysis. The epigyne of the new species is similar to that of the grey form of *A. v-insignitus* (see Zabka, 1997), but differs in having the more widely spaced wings and the more compact epigynal pocket.



Figures 44–53. Habitus of *Aelurillus khorasanicus* sp.n. (44-46 – holotype, 47-53 – paratypes). 44, 47 – male habitus, dorsal view; 45, 48 – ditto, ventral; 46, 49 – male "face"; 50 – male first leg, prolateral; 51 – female habitus, dorsal; 52 – ditto, ventral; 53 – female "face". Scales: 1 mm.

Description. Male (holotype): Carapace 2.30 long, 1.85 wide, 1.25 high at PLE. Ocular area 1.00 long, 1.30 wide anteriorly and 1.25 wide posteriorly. Diameter of AME 0.40. Abdomen 2.00 long, 1.90 wide. Cheliceral length 0.70. Clypeal height 0.30. Length of leg segments: I 1.20+0.75+0.80+0.55+0.55; II 1.20+0.80+0.75+0.55+0.50; III 1.70+0.90+0.95+1.00+0.65; IV 1.60+0.85+1.00+1.20+0.60. Leg spination: I: Fm d 1-1-5; Pt pr and rt 1; Tb pr and rt 1-1-1, v 2-2-2 ap; Mt pr and rt 1-1 ap, v 2-2 ap. II: Fm d 1-2-5; Pt pr and rt 1; Tb pr 1-1-1, rt 1-1, v 1-1-2 ap; Mt pr and rt 1-1 ap, v 2-2 ap. III: Fm d 1-2-5; Pt pr and rt 1; Tb d 1-0-0, pr and rt 1-1-1, v 1-0-2 ap; Mt d 1-1-0, pr and rt 1-0-2 ap, v 1-1-2 ap. IV: Fm d 1-1-4; Pt pr and rt 1; Tb d 1-0-0, pr 1-1-1-0, rt 1-1-1-1, v 1-0-

2 ap; Mt d 1-1-0, pr 1-1-2 ap, rt 1-0-2 ap, v 1-1-2 ap. Colouration (holotype and paratype): carapace dark brown, with black ocular area, covered with white or white-orange adpressed scales. Eye field anteriorly with a pattern of alternating four white and two yellow-orange stripes (Figures 46–49). Clypeus and “cheeks” dark brown, covered with white (paratype) or white-yellow (holotype) scales. Chelicerae yellow. Sternum dark brown. Abdomen and leg colouration varies from yellow (holotype) to dark grey (paratype). Dorsum dark brown, covered with orange (holotype) or white (paratype) scales (Figures 44, 47). Spinnerets yellow, apically dark brown. Book-lungs yellow to grey-yellow. Legs yellow (holotype) or brown-yellow (paratype), with dark brown patches and semi-rings. Patella, tibia, metatarsus and tarsus ventrally brown, covered with dark brown hairs (Figure 50). Palps yellow, cymbium brownish yellow. Palpal femur with a bulge, covered with white or white-orange hairs. Palpal patella, tibia and cymbium dorsally covered with dense white hairs, retrolaterally with orange-white ones. Tibia with two retrolateral apophyses. Palpal structure as in Figures 34–39.

Female (paratypes from MMUM): Carapace 2.20–2.60 long, 1.85–2.20 wide, 1.00–1.30 high at PLE. Ocular area 1.10–1.30 long, 1.40–1.50 wide anteriorly and 1.30–1.40 wide posteriorly. Diameter of AME 0.45. Abdomen 3.70–3.80 long, 3.10–3.30 wide. Cheliceral length 0.70–1.10. Clypeal height 0.30–0.40. Length of leg segments: I 1.20+0.75+0.75+0.45+0.45; II 1.10+0.70+0.80+0.50+0.50; III 1.70+0.85+0.85+1.00+0.60; IV 1.50+0.70+1.00+1.10+0.70. Leg spination: I: Fm d 1-1-4; Tb pr 1-1, v 2-2-2 ap; Mt pr 1-1 ap, v 2-2 ap. II: Fm d 1-2-4; Tb pr 1-1, v 1-1-2 ap; Mt pr and rt 1-1 ap, v 2-2 ap. III: Fm d 1-2-4; Pt pr and rt 1; Tb d 1-0-0, pr and rt 1-1-1, v 1-0-2 ap; Mt d 1-1-0, pr and rt 1-0-2 ap, v 1-1-2 ap. IV: Fm d 1-1-3; Pt pr and rt 1; Tb d 1-0-0, pr and rt 1-1-1, v 1-0-2 ap; Mt d 1-1-0, pr 1-1-2 ap, rt 1-0-2 ap, v 1-1-2 ap. Colouration: Carapace dark brown, with black ocular area, covered with white adpressed scales forming two indistinct longitudinal bands on thoracical part of carapace (Figure 51). Eye field with the pattern resembling that of the male, but more blurred. Clypeus and “cheeks” dark brown, covered with white and orange scales (Figure 53) and two white stripes running from ALE lateral. Sternum dark brown. Abdomen grey-yellow, ventrally with grey points, dorsally dark brown, covered with white and/or yellow-orange scales. Spinnerets yellow to yellow-brown. Book-lungs grey-yellow. Legs yellow or brownish yellow, with dark brown patches and semi-rings. Palps yellow. Structure of epigyne and vulva as in Figures 41–43.

Distribution. Khorasan Province, Iran (Figure 1).

Supplementary Material

A list of additional material of *Aelurillus concolor* is available as supplementary information via the “Supplementary” tab on the article’s online page (<http://dx.doi.org/10.1080/09397140.2014.892353>).

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