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A new species of *Asyndetus* Loew, 1869 from Iran (Diptera: Dolichopodidae)

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Abstract

A new species, *Asyndetus fallahzadehi* sp. n. from Fars Province of Iran is described and illustrated. A key to *Asyndetus* species of Iran and neighbouring countries is compiled for the first time.

Keywords: *Asyndetus, new species, Iran, Fars, key*.

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Introduction

The genus *Asyndetus* Loew, 1869 is a cosmopolite, with 110 species widely distributed across arid and subtropical zones of all zoogeographical regions. Fourteen species are recorded from Afrotropics, and 24 species are known from the Palaearctic Region (Grichanov, 2017). Negrobov (1973) reviewed Palaearctic *Asyndetus* species. Subsequently Bickel (1996) redescribed the genus, and Grichanov (2013) reviewed the Afrotropical fauna.

Considering the genus *Asyndetus*, Iranian fauna is poorly known. Negrobov (1973) mentioned a specimen of *A. connexus* (Becker, 1902) identified by Becker and collected from Iran, but not giving original material. Nevertheless, Becker and Stein (1913) did not include this species into the first contribution to the Dolichopodidae fauna of Iran. Widely distributed in the Old World, *A. latifrons* (Loew, 1857) has been only recently found in the country (Kazerani *et al*., 2014). The faunas of adjacent countries are unknown (Afghanistan, Pakistan, Kuwait, Oman, Qatar, UAE), or each numbers only 1-2 *Asyndetus* species (Grichanov, 2017). Our recent investigation has revealed three species of the genus in the Fars Province of Iran (Rezaei *et al*., 2019). *Asyndetus albifrons* Loew, 1869, and *A. chaetifemoratus* Parent, 1925 have been found in the country for the first time. The third species is described here as new for science.

Materials and Methods

A new *Asyndetus* species discovered is described here, and illustrated with a ZEISS Discovery V-12 stereo microscope and an AxioCam MRc5 camera. Genitalia preparations have been photographed with a ZEISS Axiostar stereo microscope and an AxioCam ICc3 camera. Morphological terminology and abbreviations follow Cumming and Wood (2017) and Grichanov and Brooks (2017). Body length is measured from the base of the antenna to the posterior tip of epandrium. Wing length is measured from the base to the wing apex. The types of new species and other materials examined are housed at the Zoological Museum of Moscow State University, Moscow, Russia (ZMUM), the Zoological Institute of the Russian Academy of Sciences, St. Petersburg (ZIN) and the Department of Entomology, Jahrom Branch, Islamic Azad University, Jahrom, Iran (JIAU).

Taxonomy

Genus *Asyndetus* Loew, 1869

Remarks: See Negrobov (1973), Bickel (1996) and Grichanov (2013) for diagnosis of the genus *Asyndetus*. Males differ from females usually in such male secondary sexual characters (MSSC) as densely pollinose frons

and face, absence of claws on all or some tarsi, enlarged pulvilli on all or some tarsi, sometimes modified tarsomeres, elongate ventral setae on all or some femora.

Asyndetus fallahzadehi Grichanov sp. n.

(Figs. 1–5)

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Description: *Male* (Fig. 1): ***Head*** (Fig. 2): Frons bronze-black, densely whitish grey pollinose; face shining greenish blue, densely white pollinose (MSSC), broad, weakly narrowed, slightly higher than wide under antennae (20/15); occiput concave, violet-black, grey pollinose; pair of long ocellar, pair of long vertical, and pair of shorter postvertical bristles; postocular setae relatively short, uniserial, black above, whitish below; lower postcranium with several long white setae; eyes with microscopic white hairs. Antennae inserted in about middle of head, black, as long as height of head; scape long, bare; pedicel covered with dorsal and ventral setulae, with short inner projection distally; postpedicel subtriangular, with right-angular apex, as long as high, covered with short hairs; arista-like stylus mid-dorsal, with microscopic hairs; length ratio of scape to pedicel to postpedicel to stylus, 11/9/11/47. Palpus short, yellow, with several hairs and 2 black apical setae; proboscis short, black, with short black hairs.

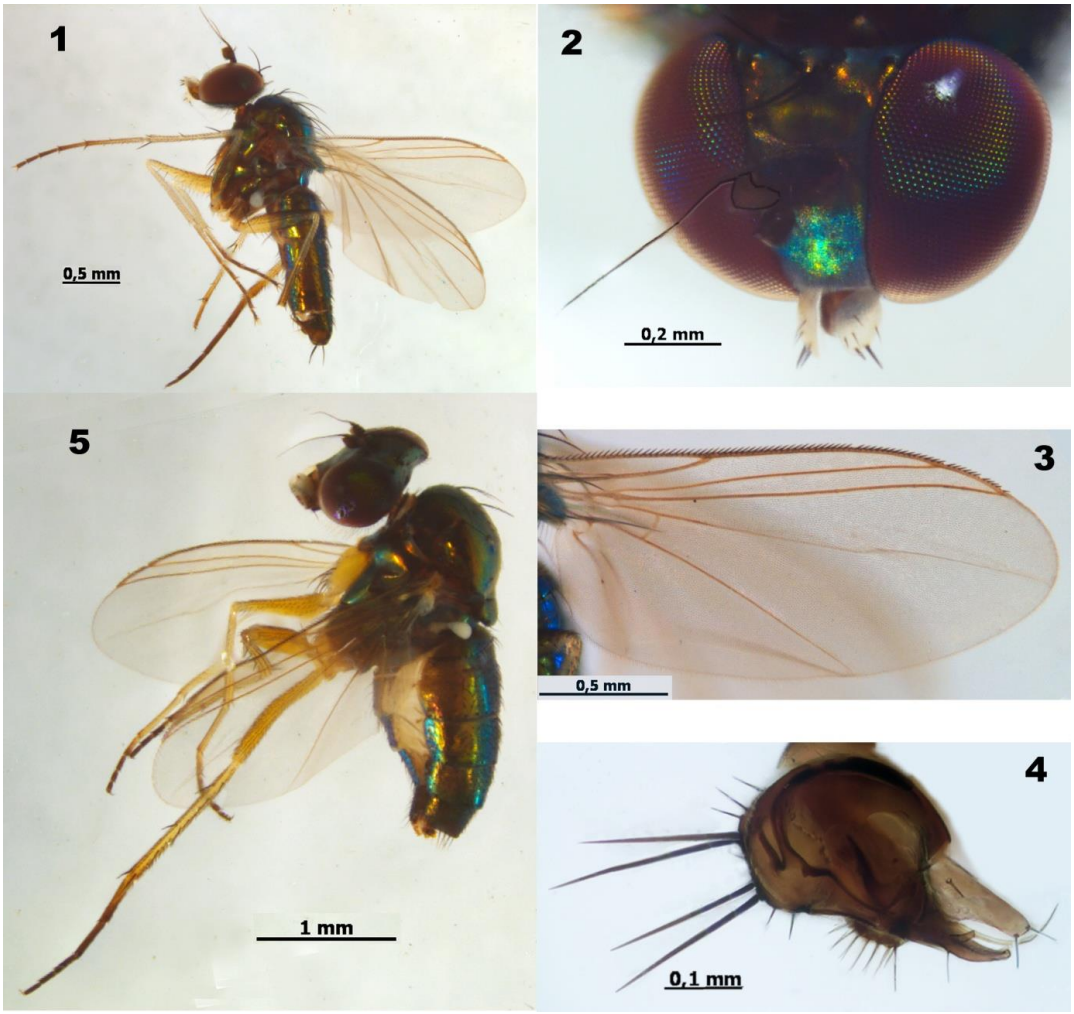
Thorax: Mesonotum metallic greenish blue; pleura violet-green, weakly pollinose; four pairs of dorsocentral bristles; acrostichals biserial, small, 3 or 4 pairs; scutellum with two long strong setae and two short lateral hairs.

Legs: Coxae mainly black, with yellow ventral apices; legs mainly yellow; fore femur often brownish dorsally; mid femur often brown in middle; hind femur blackish on distal half or third; hind tibia dark at apex; fore and mid tarsi black from apex of basitarsus; hind tarsus black except base of basitarsus yellow; fore coxa anteriorly with black hairs and setae of various length; mid coxa with black setae anteriorly and apically; mid and hind coxae with black external seta; fore femur with about 5 posteroventral setae on distal half, about as long as femur diameter (MSSC); mid femur with short setulae, with at most 2 ventral setae, half as long as femur diameter; hind femur with double row of 3 to 5 fine ventral setae, about as long as femur diameter (MSSC) and 2 or 3 fine subapical anterior setae; fore tibia without conspicuous setae; mid tibia with 2 long anterodorsal, 2 short posterodorsal bristles; hind tibia with 2 anterodorsal, 3-5 posterodorsal bristles; all tibiae with apical setae; fore tarsus with 1 claw, with 2 enlarged pulvilli (MSSC); other tarsi simple, with short claws and small pulvilli; podomeres (from tibia to fifth tarsomere) length ratio (in mm): fore leg: 0.73/0.47/0.20/0.16/0.12/0.10, mid leg: 0.81/0.52/0.25/0.18/0.13/0.11, hind leg: 1.06/0.33/0.29/0.17/0.12 /0.12.

Wing (Fig. 3): Hyaline, veins brown; R_1 ending at basal 1/3 of wing; ratio of costal section between R_{2+3} and R_{4+5} to that between R_{4+5} and M_{1+2}, 28/39. R_{2+3} and R_{4+5} straight; M_{1+2} with bend in middle of apical part, strongly weakened at bend and somewhat weakened in apical part; section of M_{1+2} between posterior cross-vein (*dm-m*) and bend slightly longer than that between bend and wing margin (80/73); *dm-m* located before level of R_1; ratio of apical portion of M_4 to *dm-m*, 97/12; anal vein distinct, anal lobe well developed, anal angle right; calypter yellow, with simple yellow cilia; halter yellow.

Abdomen: Black, with black setation; sterna 4-5 developed, setose; tergum 6 glabrous; sternum 6 and segment 7 reduced; segment 8 large, rounded, with four strong black bristles; hypopygium (Fig. 4) black, small, partly concealed; epandrium flattened laterally, with left lateral foramen; hypandrium fused with epandrium, simple, short, triangular (ventral aspect); phallus long and thin, simple; a pair of long symmetrical epandrial lobes originating near base of hypandrium, broad at base, narrow on apical half, with 2 setae on rounded apex and 1 pedunculate seta at base; surstylus bilobate, more or less straight, narrow; ventral lobe of surstylus slightly curved, bearing some short setulae and one strong middorsal seta; dorsal lobe half as long as ventral lobe, bearing short apical seta; postgonite narrow, curved ventrally, reaching apex of dorsal lobe of surstylus; cercus black, small, rounded, bearing short black setae.

Measurements (mm): Body length in ethanol 2.5-2.6, wing length/width 2.3/0.9, antenna length 0.6.



Figs. 1-5. *Asyndetus fallahzadehi* Grichanov, **sp. n.** (in ethanol): **1.** Male habitus**; 2.** Head; **3.** Wing; **4.** Hypopygium, lateral view (after maceration); **5.** Female habitus.

Female (Fig. 5): Similar to male except lacking MSSC. Femora entirely yellow. Podomeres (from tibia to fifth tarsomere) length ratio (in mm): fore leg: 0.78/0.45/0.17/0.15/0.11/0.11, mid leg: 0.98/0.58/0.24/0.20/0.11/0.11, hind leg: 1.19/0.38/0.31/0.20/0.12 /0.12.
Measurements (mm): Body length in ethanol 3.0, wing length/width 2.5/1.0.

Material examined: *Holotype*: ♂, Iran: Fars, Province, Larestan, 30.iii–9.iv.2018, 54°26'1.36"E, 27°31'55.4"N, leg. Shoreh Rezaei [ZMUM; dried and mounted on pin].
Paratypes (in ethanol): 1♂, Dalin, 52°07'54.7"E, 30°02'15.0"N, 1–7.v.2018; 2♂, same data, 1–7.v.2018; 2♀, same data, 8–14.v.2018; 1♀, same data, 15–21.v.2018; 6♂, 1♀, Dasht–e Arzhan, 51°59'3.439"E, 29°39'39.047"N, 24–30.iv.2018; 2♂, 2♀, same data, 1–7.v.2018; 1♂, same data, 8–14.v.2018; 4♂, same data, 15–21.v.2018; 2♂, 1♀, same data, 22–28.v.2018; 6♂, 10♀, Larestan, 30.iii.2018–9.iv.2018, 54°59'2.3"E, 27°32'6.7 "N; 2♂, 4♀, Larestan, 30.iii–9.iv.2018, 54°26'1.36"E, 27°31'55.4"N; 7♂, 1♀, same data, 10–20.iv.2018; 2♂, same data, 21–30.iv.2018; 1♀, same data, 1–11.v.2018; 1♂, same data, 12–21.v.2018; 1♂, Shiraz, 52°28'9.147"E, 29°36'52.373"N, 24–30.iv.2018; 2♂, same data, 1–7.v.2018; 2♂, 2♀, same data, 8–14.v.2018. [same collector; JIAU, ZIN, ZMUM; 1♂ in glycerol, mounted in vial on pin; 1♀ dried and mounted on pin].

Diagnosis: The new species is close to *Asyndetus chaetifemoratus* Parent, 1925, and *A. albifacies* Parent, 1929 (Negrobov, 1973; Grichanov, 2013), differing from these species in mainly yellow femora in male and entirely yellow femora in female; male fore femur often brownish dorsally; mid femur often

brown in middle; hind femur blackish on distal half or third. Femora are mostly dark in *A. chaetifemoratus* and *A. albifacies.* In addition, in male *A. chaetifemoratus*, all femora have complete rows of long ventral setae, at least as long as femur diameter; anterior tibia has short, but strong posteroventral seta at distal 1/5. Male *A. albifacies* has no long ventral setae on anterior tibia, bearing two complete ventral rows of long setae on hind tibia. In contrast, *A. fallahzadehi* **sp. n.** males bear relatively short ventral setae on fore and hind femora, about half as long as corresponding femur diameter.

Etymology: This species is named in honor of Iranian entomologist Dr. Majid Fallahzadeh (Department of Entomology, Jahrom Branch, Islamic Azad University, Jahrom).

Key to *Asyndetus* species of Iran and neighbouring countries
(males only)

1. Wing vein *dm-m* absent …… 2
– Wing vein *dm-m* present ……...……..4
2. Apical part of M_{1+2} distinctly broken; coxae and femora dark; 1.7-2.2mm……...***A. separatus*** **(Becker)**
– M_{1+2} not broken, only attenuated, often faded; anterior coxa and all femora yellow…….3
3. Antenna longer than face height; postpedicel distinctly longer than high; 1.5-2.3mm..……....***A. longicornis*** **Negrobov**
– Antenna shorter than face height; postpedicel not longer than high; 2.0mm ……..***A. connexus*** **(Becker)**
4. Palpus dark ……...…….5
– Palpus yellow ……..……...8
5. Male posterior tibia with row of very long black ventral setae along entire length; M_{1+2} stepwise broken; 2.25mm….***A. varus*** **Loew**
– Posterior tibia without row of long ventral setae……6
6. Section of M_{1+2} between posterior cross-vein (*dm-m*) and bend about as long as that between bend and wing margin; epandrial lobe short and wide, distinctly shorter than surstylus, bearing two apical setae; 2–3 mm ……..***A. latifrons*** **(Loew)**
– Section of M_{1+2} between *dm-m* and bend distinctly longer than that between bend and wing margin…….7
7. Frons silvery-white pollinose; epandrial lobe present, long and thin; 2.5 mm …… ……..***A. albifrons*** **Parent**
– Frons grey pollinose; epandrial lobe reduced; 2.5–3 mm….***A. virgatus*** **Curran**
8. Posterior femora without long ventral setae ……9
– Posterior femora with long ventral setae, at least half as long as diameter of femur in middle……...10
9. Femora dark; M_{1+2} interrupted(?); *dm-m* positioned at extreme base of wing; 2.0-2.5mm……..……***A. transversalis*** **(Becker)**
– Femora yellow; M_{1+2} undulate; 2.2-2.5mm ……..…..….***A. izius*** **Negrobov**
10. Femora mainly yellow; fore femur often brownish dorsally; mid femur often brown in middle; hind femur blackish on distal half or third ……..***A. fallahzadehi*** **sp.n.**
– Femora mostly dark …….11
11. All femora with complete rows of long ventral setae, at least as long as femora diameter; anterior tibia with 1 anterodorsal, 1 posterodorsal and 1 posteroventral setae; 3.0-3.5mm….....***A. chaetifemoratus*** **Parent**
– Only posterior femora with 2 complete ventral rows of long setae; anterior tibia without setae; 2.5mm……..***A. albifacies*** **Parent**

Discussion

Asyndetus species are common in subtropics and tropics of the Old World. The Palaearctic species of the genus are confined mainly to the Mediterranean and Central Asian regions. Only *A. latifrons* (Loew) is widely distributed in the Afrotropical, Palaearctic and Oriental Regions (Grichanov, 2013).

Asyndetus fallahzadehi **sp. n.** is found only in the Fars Province, being probably endemic to the South Iran. The latter territory is traditionally included in the Palaearctic zoogeographical region, but having a significant Afrotropical element in its fauna (Kryzhanovsky, 2002).

As a result, the long-legged fly fauna of Fars Province comprises of 6 nominal species (see Rezaei *et al*., 2019), and the genus *Asyndetus* includes 5 known species from Iran.

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