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New records of the scuttle flies (Diptera, Phoridae) from Iran

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ABSTRACT. The faunistic study of the family Phoridae carried out in northwestern of Iran during 2013–2017. Five species (*Conicera tibialis* Schmitz, 1925, *Dohrniphora cornuta* (Bigot, 1857), *Gymnophora arcuata* (Meigen, 1830), *Metopina oligoneura* (Mik, 1867) and *Triphleba intermedia* (Malloch, 1908)) are newly recorded from Iran. The genera *Conicera* Meigen, 1830, *Dohrniphora* Dahl, 1898, *Gymnophora* Macquart, 1835 and *Triphleba* Rondani, 1856 are reported for the first time from the country. Diagnostic characters of the studied species along with their photographs are provided.

Key words: Phoridae, *Conicera*, *Dohrniphora*, *Gymnophora*, *Triphleba*, Iran, New records

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Introduction

Phoridae with about 4,000 identified species in more than 260 genera, is considered as one of the largest families of Diptera (Ament & Brown, 2016). This family is composed of four subfamilies; Sciadocerinae, Chonocephalinae, Phorinae, and Metopininae (Disney & Mostovski, 2018). They occur in every known terrestrial habitat, including larvae inhabiting fresh-water and marine situations. Larvae were reported to be commonly found in nests of social insects and organic detritus such as dung, carrion, insect feces and dead snails. Some species feed on living plants, sporophores of bracket and other fungi and mycelium. Most of them are predators, parasitoids or parasites of earthworms, snails, spiders, centipedes, millipedes, and insect eggs, larvae, and pupae. The adults usually feed on nectar, honeydew and the exudates of fresh carrion and dung, whereas there are some other adults which are polyphagous saprophages. This family is also excellent for modelling biodiversity conservation efforts (Disney, 1994).

Adults of this family have some distinctive characteristics as small (0.5–6 mm) cyclorrhaphan flies, frons usually with distinctive setation, thorax shortened, scutum arched and wing present, reduced or absent. Wing venation highly characteristic, with thickened costal and radial veins, and thin, linear posterior veins without any cross-veins linking them. Hind femur of most phorids flattened, broad. At least hind tarsomere with one longitudinal

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setal palisade (Ament & Brown, 2016). This family now contains more than 900 Palaearctic species (Pape et al., 2009). Regarding this, a few studies have been conducted in neighboring countries such as Turkey and Azerbaijan (Disney & Bayram, 1999; Karapazarlioglu & Disney, 2015; Mostovski, 2002; Mostovski & Disney, 2002; Özsisli & Disney, 2011). The Iranian fauna of Phoridae is poorly known and needs to be investigated more. So far, only 18 species have been known from Iran (Disney et al., 2012; Ghahari & Disney, 2007; Rabieh et al., 2013; Sadeghi et al., 2013; Talebi et al., 2003, 2006; Zamani et al., 2005). The present study aims to study the Phoride in northwestern of Iran.

Material and methods

Adult specimens were collected by standard sweeping net and Malaise trap from grassland and wetland habitats of East Azerbaijan and West Azerbaijan provinces, located in northwestern of Iran during 2013–2017. The species were identified based on Disney (1983); Kung & Brown (2006). Localities, Diagnostic characters and distributions of identified species at the present study are given briefly. Diagnostic characters follows that of Disney (1983, 2017); Kung & Brown (2006) and over material observations. Photographs were taken using a Nikon SMZ 800N stereomicroscope equipped with a Nikon D5200 digital camera. Illustrations carried out by Disney (1983).

The material examined deposited at the following insect collections: ICHMM: Insect Collection of Professor Hasan Maleki Milani, University of Tabriz, Tabriz, Iran and UCMZ: University of Cambridge Museum of Zoology, Cambridge, England.

Results

Five genera and five species belonging to the subfamilies Metopininae and Phorinae were collected in East Azerbaijan and West Azerbaijan provinces. All species and four genera which marked with an asterisk, are newly recorded for the Iranian phorid fauna (**Conicera tibialis* Schmitz, 1925; **Dohrniphora cornuta* (Bigot, 1857); **Gymnophora arcuata* (Meigen, 1830); *Metopina oligoneura* (Mik, 1867) and **Triphleba intermedia* (Malloch, 1908)).

Key to the genera of the Phoridae Newman, 1835 known from Iran (With some modification from Disney, 1983, 2017; Kung & Brown, 2006; Mostovski, 2016)

1. Third thin vein with a sudden bend near middle, opposite basal curve of second thin vein. .....***Metopina*** Macquart

- Third thin vein without such bend. **2**

2. Hind tibia with one or more dorsal or near dorsal longitudinal palisade-like rows of setae. **3**

- Hind tibia simply haired on dorsal face, but may bear isolated bristles. **6**

3. Hind tibia with more than one dorsal palisade-like row of setae. ……..…… ….……..….....***Diplonevra*** Lioy

- Hind tibia with only one dorsal palisade-like row of setae. ……..**4**

4. Either middle or hind tibiae with one or more isolated bristles in proximal two-thirds in addition to apical bristles. ….……***Dohrniphora*** Dahl

- Tibiae without isolated bristles in proximal two-thirds. **5**

5. Male with proctiger ending in finely-feathered bristles that are clearly more robust than setae on cerci. Female with tergites present only on abdominal segments 1–4. …….. ….……..***Phalacrotophora*** Enderlein

- Male with proctiger ending in setae that little, if any, stronger than those on cerci. Female with tergites present on abdominal segments 1–6. …..…..…….. ……...……...…..***Megaselia*** Rondani

6. Middle and/or hind tibiae with isolated. ……..……**7**

- Middle and hind tibiae without isolated bristles. ……..……**9**

7. Middle tibia with at least two dorsal bristles situated one below the other; frons with a complete median furrow; entire body, including legs, velvety black. ..……...***Phora*** Latreille

- Middle tibia with at most one dorsal bristle; frons without a complete median furrow; body variously coloured but never vel-vety black. ……..……..……**8**

8. Rs unforked. ….……***Conicera*** Meigen

- Rs forked. .....***Triphleba*** Rondani

9. Third antennal segment with a long-haired tapered apex; wing with distinct anal lobe; hind femur slender and anal tube longer than epandrium. …… ……..……..……***Arabiphora*** Disney

- Without this combination ……....**10**

10. Frons lacking bristles between antennae and ocelli. ….....***Gymnophora*** Macquart

- Frons with bristles between antennae and ocelli. ...***Chonocephalus*** Wandolleck

List of species

Subfamily Metopininae

Genus *Gymnophora* Macquart, 1835

***Gymnophora arcuata* (Meigen, 1830)**
(Figures 1A–1B)

Material examined: (1♂) Iran, East Azerbaijan province, Qurigol region, 37°54.736' N 46°41.617' E, 1928 m, wetland, 5.vii.2013, leg: S. Khaghaninia (UCMZ).

Diagnostic characters: Body length 2.0–3.9 mm, mediolaterals differ from adjacent hairs, but much weaker than bristles on vertex; costa abruptly thickened before R_1, with clear spot, R_1 curves smoothly forward; abdomen greyish-brown; haltere yellow; legs yellowish brown; left side of epandrium with small anteroventral lobe; left side of hypandrium with long process, which is greatly swollen at mid-length.

Distribution: Austria, Belgium, Caucasus, Czechoslovakia, Denmark, England, Finland, France, German Federal Republic, German Democratic Republic, Great Britain, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Portugal, Poland, Sweden, Spain, Switzerland (Brown, 1987; Disney, 1991; Mostovski & Mikhailovskaya, 2003).

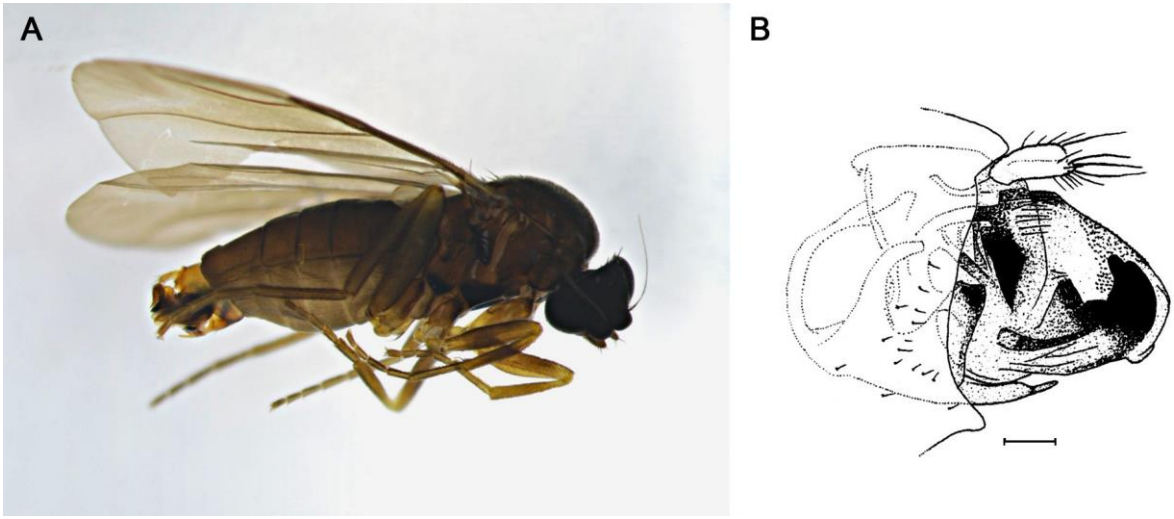

Figure 1. *Gymnophora arcuata* (Meigen, 1830) (male): **A.** Lateral view; **B.** Hypopygium (left side – Scale bar: 0.1 mm).

Genus *Metopina* Macquart, 1835

***Metopina oligoneura* (Mik, 1867)**
(Figures 2A–2B)

Material examined: (1♂) Iran, West Azerbaijan province, Khoy city, Evogli region, 38°42.436' N 45°12.246' E, 968 m, Malaise trap, 26.iv.2013, leg: S. Khaghaninia (UCMZ).

Diagnostic characters: Venter with a distinct ventral plate on segment 4, bearing irregular rows of hairs along the lateral margins but none along the median third; the irregular extension of this plate anteriorly bears some hairs in a more median position; the main plate usually has an obviously concave posterior margin; sensory patch on posterior face of base of hind femur usually visible as a darker smudge at relatively low magnification

Distribution: Austria, Czechoslovakia, Denmark, France, German Federal Republic, Great Britain, Ireland, Italy, Poland, Spain, Switzerland (Disney, 1991).

Subfamily Phorinae

Genus *Conicera* Meigen, 1830

***Conicera tibialis* Schmitz, 1925**
(Figures 3A–3C)

Material examined: (6♂♂) Iran, West Azerbaijan province, Khoy city, Evogli region, 38°42.436' N 45°12.246' E, 968 m, Malaise trap, 26.iv.2013, leg: S. Khaghaninia (2 males, UCMZ, 4 males ICHMM).

Diagnostic characters: Claspers of hypopygium developed as irregular lobes which tend to be rounded; pit of sense-organ on mid-femur larger and apical process longer; male claspers not tapered but with rounded at tips.

Distribution: Austria, Belgium, Canary Island, Czechoslovakia, Denmark, Finland, German Federal Republic, German Democratic Republic, Great Britain, Hungary, Ireland, Italy, Israel, Netherlands, Nearctic Region, Portugal, Poland, Sweden, Spain (Disney, 1983, 1991).

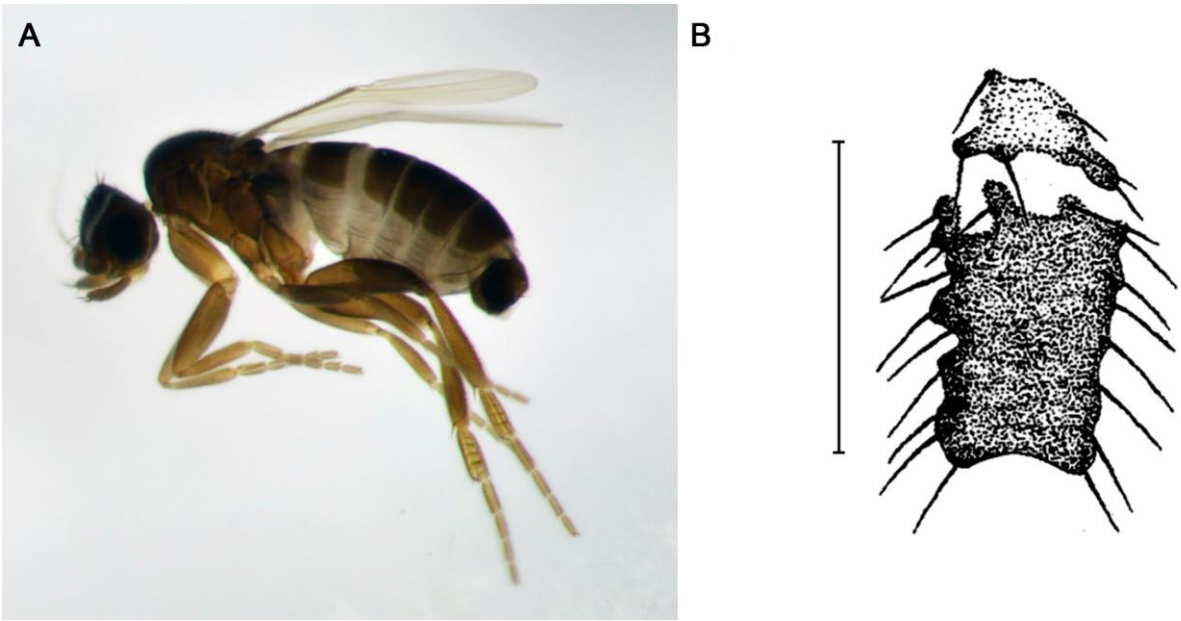

Figure 2. *Metopina oligoneura* (Mik, 1867) (male): **A.** Lateral view; **B.** Hair patch of abdominal segment 4 (ventral view - Scale bar: 0.1 mm).

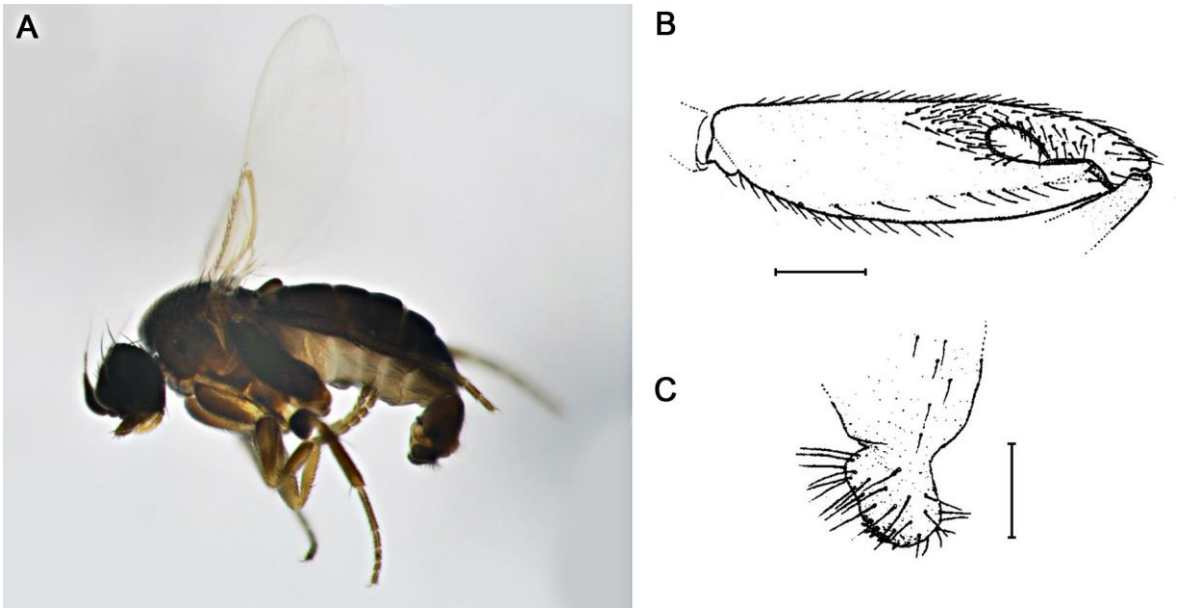

Figure 3. *Conicera tibialis* Schmitz, 1925 (male): **A.** Lateral view; **B.** Mid femur (posterior face - Scale bar: 0.1 mm); **C.** Right clasper of hypopygium (externaly- Scale bar: 0.1 mm).

Genus *Dohrniphora* Dahl, 1898

***Dohrniphora cornuta* (Bigot, 1857)**
(Figures 4A–4B)

Material examined: (1♂) Iran, East Azerbaijan province, Kandovan region, 37°46.10' N, 46°16.001' E, 2500 m, grassland, 25.vi.2014, leg: S. Khaghaninia (UCMZ).

Diagnostic characters: Mean body length 1.70 mm; frons dark brown to black; scutum and scutellum dark brown; halteres yellow; posterior face of hind femur with short, fine, sparse dorsal setae in basal third, in addition to a group of four or five thicker ventral peg-like setae; hind tibia without isolated setae, abdominal tergites mostly dark.

Distribution: Cosmopolitan (Kung & Brown, 2006).

Genus *Triphleba* Rondani, 1856

***Triphleba intermedia* (Malloch, 1908)**
(Figures 5A– 5B)

Material examined: (5♂♂) Iran, East Azerbaijan province, Sufiyan city, Mazraeh region, 38°17.01' N, 46°10.02' E, 1469 m, grassland, 30.vi.2016, leg: S. Khaghaninia (3 males, UCMZ, 2 males ICHMM).

Diagnostic characters: Vein 3 forked; hairs of arista longer than maximum width of base of third segment of arista, scutellum with 2 pairs of bristles; halteres dark brown to black; left side of epandrium with process divided into two arms; lower arm of process of left side of epandrium very larger than upper arm, hind tibia usually with a bristle in upper half on anterior face.

Distribution: Austria, Czechoslovakia, Denmark, Finland, German Federal Republic, German Democratic Republic, Great Britain, Hungary, Ireland, Netherlands, Norway, Sweden, Spain (Disney, 1991).

Discussion

Few studies have been conducted on phorid's in Iran, as a result about 18 species belong to seven genera are recorded from Iran so far. This study adds three genera to the Iranian checklist. *Conicera tibialis* was recorded most frequently. It is commonly known as coffin-fly, a common name

derived from its frequent occurrenc in buried corpses. The larvae, pupae and adults of this species have been extensively reported to be on bodies buried for at least 1 year (Disney, 1983, 2006; Martin-vega et al., 2011). The second most commonly occurred species was *Triphleba intermedia* and the other species were as single males. *Dohrniphora cornuta* is considered to be polyphagous saprophage in the larval stage, commonly breeding in a wide range of decaying organic materials such as dead insects, dead snails, vertebrate carrion, sewage compost and similar conditions (Disney, 1983; Disney et al., 2014). *Metopina oligoneura* adults visit flowers, including *Hypochoeris radicata, Ranunculus acris, Leontodon autumnalis, Taraxacum officinale, Anthemis cotula* (Disney, 1979). It is also reported from meat baits buried in the soil (Disney, 1994).

The identified species in this study were collected from grasslands and wetlands using Malaise traps. Investigations of different habitats, the employment of different collecting methods (e.g. pitfall traps) and readings from different situations (such as fungi or invertebrate hosts) in the future are likely to add many more species.

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Conflict of Interests

The authors assert that there is no conflict of interest regarding the publication of this paper.

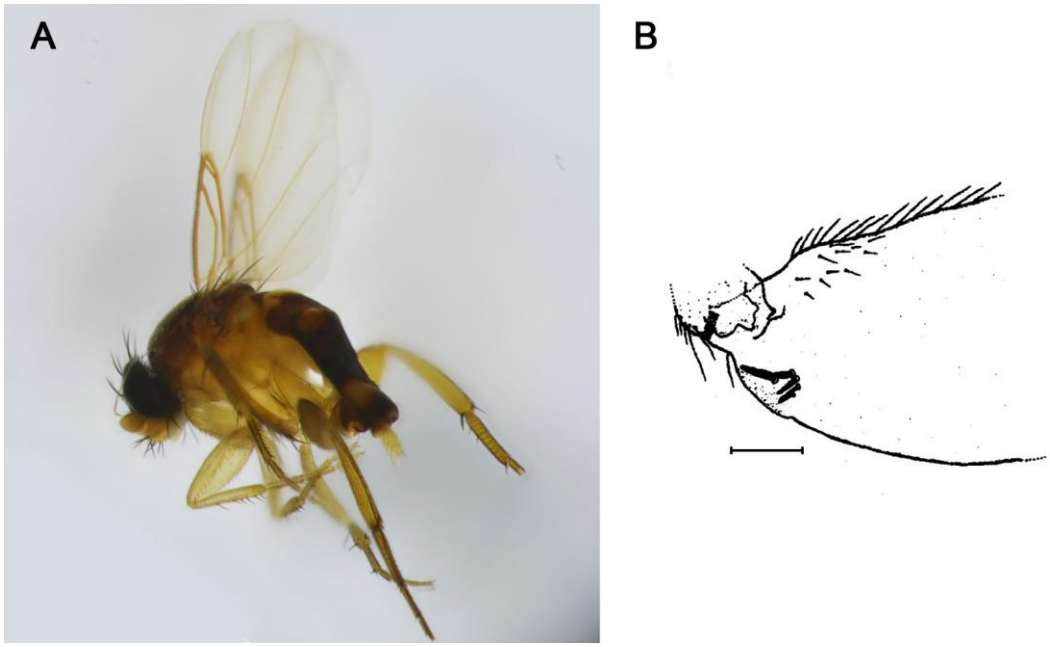

Figure 4. *Dohrniphora cornuta* (Bigot, 1857) (male): **A.** Lateral view; **B.** Base of hind femur (posterior face - Scale bar: 0.1 mm).

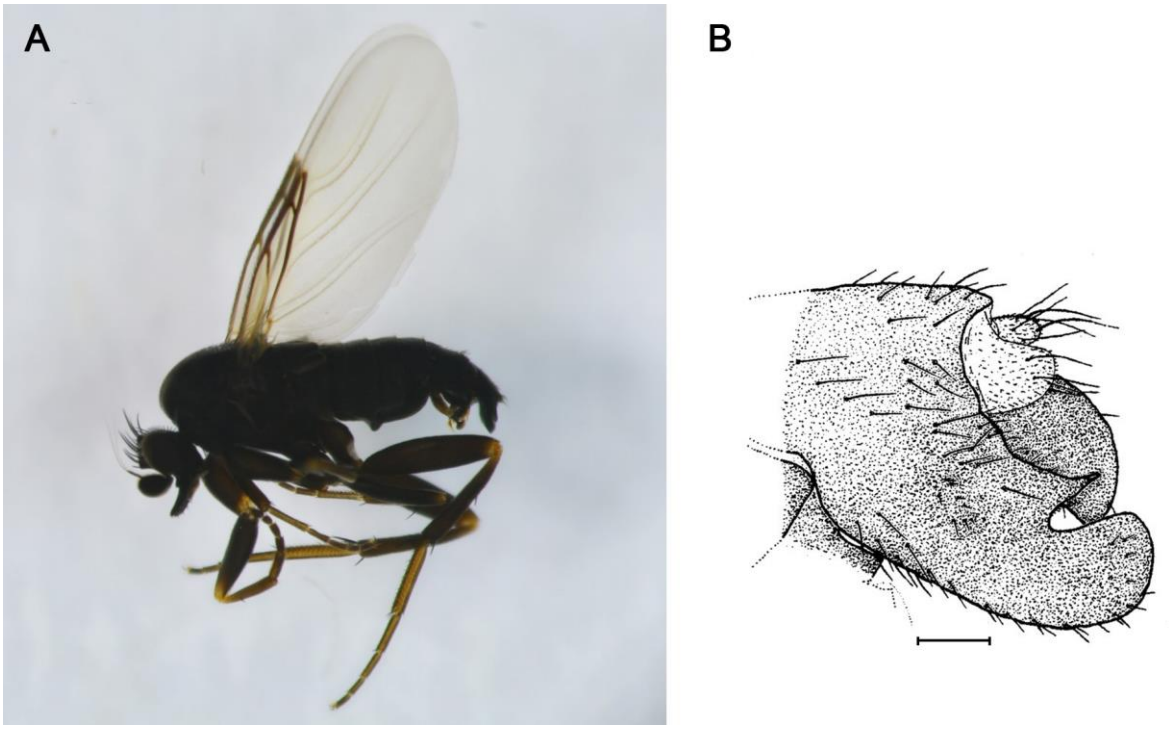

Figure 5. *Triphleba intermedia* (Malloch, 1908) (male): **A.** Lateral view; **B.** End of epandrium (left side - Scale bar: 0.1 mm).

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گزارش جدید از مگس‌های خانواده Phoridae (Diptera) برای ایران

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چکیـــده: مطالعه فونستیک مگس‌های خانواده Phoridae طی سال‌های ۱۳۹۲ تا ۱۳۹۶در شمال‌غرب ایران انجام شد. پنج گونه *Conicera tibialis* Schmitz, 1925، *Dohrniphora cornuta* (Bigot, 1857)، *Gymnophora arcuata* (Meigen, 1830)، *Metopina oligoneura* (Mik, 1867) و *Triphleba intermedia* (Malloch, 1908) برای فون ایران جدید هستند. همچنین جنس‌های *Conicera* Meigen, 1830، *Dohrniphora* Dahl, 1898، *Gymnophora* Macquart, 1835 و *Triphleba* Rondani, 1856 برای اولین‌بار از ایران گزارش می‌شوند. ویژگی‌های افتراقی گونه‌های مورد مطالعه به‌همراه تصاویر آنها آمده است.

واژگـــان کلیدی: Phoridae، *Conicera*، *Dohrniphora*، *Gymnophora*، *Triphleba*، ایران، گزارش‌های جدید