Study of the robber flies (Diptera: Asilidae) in East and West Azerbaijan provinces of Iran, with two new species records for the country

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ABSTRACT. Based on specimens collected from East Azerbaijan and West Azerbaijan provinces during 2014–2016, fourteen species of the family Asilidae are collected and identified. Two of them, e.g. Dysmachus transcaucasicus Richter, 1962; Saropogon megriensis Richter, 1966 are recorded from Iran for the first time. All species are listed along with their geographic distributions. Diagnostic characters as well as supplementary illustrations of new records are provided.

Key words: Asilidae, East Azerbaijan, West Azerbaijan, Iran, New records.

Introduction

The robber flies (Diptera: Asilidae) is a large family with 7187 described species (Geller-Grimm et al., 2015) and 776 genera in the world (Dikow, 2016). The comprehensive study by Dikow (2009) proposes a revised, phylogenetic classification of Asilidae into 14 subfamily taxa. Robber flies are small to very large (3–50 mm) flies, often with conspicuous dense hair or almost bald. Eyes are large, dichoptic in both sexes, separated by markedly deepened vertex. All of them are very good flyers with long legs which serve for catching preys (Major, 1997). All robber flies are predators in larval and adult stages. Females in the subfamily Stenopogoninae and Dasypogoninae deposit their eggs into soil. While females of the genera Eutolmus and Dysmachus lays their eggs on grass or other plant leaves. However, Laphria and Choerades females deposit their eggs in front of holes of xylophagus insects and cracks in bark (Lehr, 1988; Weinberg & Bachli, 1995). The majority of the larvae live in soil but those of the Laphriinae and Laphystiinae occur in decaying logs and stumps, where they feed on larvae and pupae of other insects (Geller-Grimm, 2002). The majority of species of Asilidae frequently observed in dry and sandy areas, a condition well shown by the greater numbers of species found in arid and semiarid regions, but even in desert or semi-desert countries the small drains of dry steam beds attract the greatest number, and sometimes the entire robber fly population of a region will be restricted to such places.
which also have the maximum vegetation and the greatest population of insects upon which the flies feed (Hull, 1962). Investigations on Asilidae in Iran are strongly restricted and have been conducted principally by non-Iranian researchers. Portschinsky (1873) described 2 new species from Iran. Bigot (1880), Hermann (1905), Becker and Stein (1913), Engel (1930), Oldroyd (1958), Janssens (1961), Abbassian-Lintzen (1964a, b), Tsacas (1968), and Theodor (1980) contributed to the knowledge of Iranian fauna. Timon-David (1955), Hradsky and Geller-Grimm (1998), Tomasovic (1999, 2002) were described some new species from Iran. So far 242 species of Asilidae were identified from Iran (Lehr et al., 2007; Hayat et al., 2008; Saghaei et al., 2008, and Mohammadi & Khaghaninia 2016a, 2016b).

Material and methods

Individual flies were collected using handy entomological net from the various regions of the East Azerbaijan and West Azerbaijan provinces of Iran during 2014–2016. To dissect the male genitalia, the end of the abdomen was removed and boiled in KOH solution, and then placed in acetic acid. The genitalia were washed and then stored in glycerine and examined under a stereo microscope. Distribution of species mostly follows Geller-Grimm et al., 2015, with minor additions and corrections. Morphological terminology follows that of Bei-Bienko G. (1988) and Geller-Grimm (2003, 2015). Collected specimens are deposited at the Collection of Dr. H. Maleki Milani, University of Tabriz, Iran (ICHMM) and the third author’s personal collection.

Results

In this study, fourteen species belong to eleven genera were identified. Of them, two species Dysmachus transcaucasicus Richter, 1962 and Saropogon megriensis Richter, 1966 are being newly reported for the Iranian fauna which are marked with an asterisk.

The list of species

1. Anisopogon hermanni (Engel, 1930)
   Material examined: East Azerbaijan province, Kandovan, (37° 46.10’ N, 46° 16.001’ E) 2500 m, 25.6.2015, 2♂♂, leg. S. Khaghaninia.
   Iranian Records: Fars (Lehr et al., 2007).
   Distribution: Israel, Kazakhstan, former South European territory, former Transcaucasus Republics, Turkey (Geller-Grimm et al., 2015).

2. Didysmachus picipes (Meigen, 1820)
   Material examined: East Azerbaijan province, Kandovan, (37° 44.200’ N, 46° 18.001’ E) 3090 m, 20.5.2015, 1♂; West Azerbaijan province, Ziveh, (37°08′ N, 44°52′ E) 2630 m, 26.06.2015, 2♂♂, leg. S. Khaghaninia.
   Iranian Records: Fars and Yazd (Lehr et al., 2007), West Azarbaijan (Shoeibi & Karimpour, 2010).
   Distribution: Albania, Armenia, Austria, Azerbaijan, Czech Republic, Denmark, Finland, France, Georgia, Germany, Hungary, Italy, Kazakhstan, Norway, Poland, Romania, Russia (North, Central and South European territory, West Siberia), Sweden, Switzerland, The Netherlands, Turkey, Ukraine, former Yugoslavia (Geller-Grimm et al., 2015).

3. Dysmachus bilobus Loew, 1871
   Material examined: East Azerbaijan province, Qariqaghe forests, (38°55.601’ N, 46°45.932’ E) 1313 m, 20.6.2015, 2♂♂; Qurigol, (37° 55.305’ N, 46° 41.542’ E) 1928 m, 8.7.2015, 2♂♂, leg. S. Khaghaninia.
   Iranian Records: Golestan (Lehr et al., 2007).
   Distribution: Armenia, Azerbaijan, Bulgaria, Georgia, Kirgyzstan, Romania, Russia (South European territory), Turkey, Ukraine, Uzbekistan, former Yugoslavia (Geller-Grimm et al., 2015).
4. *Dysmachus praemorsus* (Loew, 1854)

**Material examined:** East Azerbaijan province, Arasbaran, (46° 26.536’N, 44° 54.041’ E) 1534m, 21.6.2015, 1♂, 1♀; Horand, (38° 53.838’ N, 47° 16.988’ E) 1367m, 20.6.2015, 1♂, 1♀; Chichekli, (38° 37.169’ N, 46° 26.536’ E) 1534m, 20.06.2015, 2♂♂; Kandovan, (38° 46.985’ N, 46°15.686´ E) 2341m, 24.07.2016, 1♂, leg. S. Khaghaninia.

**Iranian Records:** East Azarbaijan (Shoeibi and Karimpour, 2010), Fars (Lehr et al., 2007).

**Distribution:** Albania, Austria, Bulgaria, France, Germany, Hungary, Poland, Romania, Turkey, Ukraine, former Yugoslavia (Geller-Grimm et al., 2015).


**Material examined:** East Azerbaijan, Chichekli, (38° 37.169’ N, 46° 26.536’ E) 1534m, 21.6.2015, 1♂; Horand, (38° 53.838´ N, 47° 16.988´ E) 1367m, 20.6.2015, 2♂♂, leg. S. Khaghaninia.

**Distribution:** Armenia, Turkey (Geller-Grimm et al., 2015). Iran (New record).

**Diagnostic characters:** Mesopleuron without bristles or with inconspicuous weak ones only; dc and ac well developed, usually reaching level of humeral calli; Legs black (Fig. 1); fore femur on lower side with well developed bristle (Fig. 2); Abdomen and abdominal segments shortened and robust, apex of abdomen turned upward; Sternites with strong bristles at least on segments 2–4; Terminalia small; Two halves of epandrium without notch along middle margin on upper side; sternit 8 of female membranous along lower margin in apical half; Body 13 to 18 (Bei-Bienko, 1988 and Major, 2000) (Figs 4–8).

6. *Laphria aurea* (Fabricius, 1794)

**Material examined:** East Azerbaijan province, Chichekli, (38° 37.169’ N, 46° 26.536´ E) 1534m, 1♂, leg. S. Khaghaninia.

**Iranian Records:** Mazandaran, Qom (Ghahari et al., 2007).

**Distribution:** Austria, Bulgaria, Czech Republic, France, Greece, Hungary, Israel, Italy, Romania, Russia (South European territory), Slovakia, Turkey, former Yugoslavia (Geller-Grimm et al., 2015).

7. *Machimus annulipes* (Brullé, 1832)

**Material examined:** East Azerbaijan province, Horand, (38° 53.838’ N, 47° 16.988’ E) 1367m, 21.8.2015, 1♂; West Azerbaijan province, Urmieh, (36° 58.01´ N, 45° 23.832´ E), 26.6.2015, 3♀♀, leg. S. Khaghaninia.

**Iranian Records:** Fars (Saghaei et al., 2010), Kermanshah, Semnan (Hayat et al., 2008).

**Distribution:** Albania, Azerbaijan, Bosnia-Herzegovina, Bulgaria, Croatia, Great Britain, Greece, Hungary, Israel, Poland, Romania, Slovenia, Switzerland, Turkey (Geller-Grimm et al., 2015).

8. *Philodicus ponticus* (Bigot, 1880)

**Material examined:** East Azerbaijan province, Arasbaran, (46° 26.536’N, 44° 54.041’ E) 1534m, 21.6.2015, 1♂; West Azerbaijan province, Ziveh, (37° 08′N, 44° 52′E) 2630 m, 24.07.2015, 3♀♀, leg. S. Khaghaninia.

**Iranian Records:** Fars (Saghaei et al., 2008; Tomasovic & Saghaei, 2009), Golestan, Guilan (Hayat et al., 2008), Kerman, Khorasan (Becker & Stein, 1913), Khuzestan (Chahari et al., 2007), Sistan & Baluchestan (Becker & Stein, 1913; Oldroyd, 1958), Iran (no locality cited) (Engel, 1930; Theodor, 1980).

**Distribution:** Afghanistan, Greece, Iraq, Israel, South European territory, Soviet Middle Asia, former Transcaucasus Republics (incl. Azerbaijan), Turkey (Geller-Grimm et al., 2015).

9. *Philonicus albiceps* (Meigen, 1820)

**Material examined:** East Azerbaijan province, Qaradagh forests, (38° 55.601´ N, 46° 46.932´ E) 1313 m, 21.7.2015, 1♂, 1♀, leg. S. Khaghaninia.
Iranian Records: Fars (Tomasovic & Saghaei, 2009), Guilan, Northern Iran (Ricardo, 1920), Kordestan (Hayat et al., 2008), Mazandaran (Ghahari et al., 2007).

Distribution: Albania, Austria, Azerbaijan, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece, Hungary, Iceland, Ireland, Israel, Italy, Liechtenstein, Luxembourg, Malta, Mongolia, Norway, Poland, Portugal, Romania, Russia (East Siberia, Far East), Slovakia, Slovenia, Spain, Sweden, Switzerland, The Netherlands, Turkey, United Kingdom (Geller-Grimm et al., 2015).


10. *Polyphonius laevigatus* Loew, 1848

**Material examined:** East Azerbaijan province, Kandovan, (37° 45.00’ N, 46° 18.002’ E) 2840, 16.6.2015, 2♂♀, leg. S. Khaghaninia.

**Iranian Records:** Khuzestan (Oldroyd, 1958), West Azarbaijan (Shoeibi & Karimpour, 2010).

**Distribution:** Albania, Azerbaijan, Greece, Palestine, Syria, Turkey (Geller-Grimm et al., 2015).

11. *Polysarca violacea* Schiner, 1867*

**Material examined:** East Azerbaijan province, Kandovan, (37° 44.200’ N, 46° 18.001’ E) 3090m, 25.7.2016, 1♂; Qaradagh forests, (38° 55.601’ N, 46° 46.932’ E) 1313 m, 21.7.2015, 3♂♂, leg. S. Khaghaninia.

**Iranian Records:** Guilan (Lehr, 1963).

**Distribution:** Algeria, Tunisia, Turkey (Geller-Grimm et al., 2015).
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12. Promachus leoninus Loew, 1848
Material examined: East Azerbaijan province, Chichekli, (38°37.169′ N, 46°26.536′ E) 1534m, 26.6.2015, 2♂♂, leg. S. Khaghaninia.

Iranian Records: Golestan, Kerman (Hayat et al., 2008), Iran (no locality cited) (Lehr, 1988).

Distribution: Azerbaijan, Bosnia-Herzegovina, Croatia, Greece, India, Israel, Myanmar (Burma), Romania, Russia, Slovenia, Turkey (Geller-Grimm et al., 2015).

13. Saropogon megriensis Richter, 1966*
Material examined: East Azerbaijan province, Arasbaran, (38° 50.487′ N, 46°54.189′ E) 1656m, 26.6.2016, 1♀, leg. S. Khaghaninia.

Iranian Records: Golestan, Mazandaran (Ghahari et al., 2007).

Distribution: Turkey (Geller-Grimm et al., 2015).

Discussion
During recent years a large amount of specimens of the family Asilidae have been collected from East and West Azerbaijan provinces. Philodicus ponticus (Bigot, 1880) is one of the most common robber fly species in our country, followed by Machimus annulipes (Brullé, 1832) and Philonicus albiceps (Meigen, 1820) (Mohammadi & Khaghaninia, 2016). The first species was the most common asilid in the study area, and the latter can be found...
mostly at higher elevations. Didymachus picipes (Meigen, 1820) appeared to be comparatively common species. More interesting is the finding of Saropogon platynotus (Loew, 1847) of the subfamily Dasypogoninae, which is nearly rare in Iran (Ghahari et al., 2007). East and West Azerbaycan provinces are large region with various biogeographical areas, so it is expected that further species can be found in this area. As the fauna of the family Asilidae remain unknown, so study of this family in East and West Azerbaycan provinces can increase the number of species of this family in Iran.

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Conflict of Interests
The author declare that there is no conflict of interest regarding the publication of this paper.

References


مطالعه دزد مگس‌ها (Diptera: Asilidae) در استان‌های آذربایجان شرقی و غربی با گزارش دو گونه جدید برای کشور

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چکیده: بر اساس نمونه‌های جمع‌آوری شده از استان‌های آذربایجان شرقی و غربی، گونه‌های Asilidae و Saropogon و Dysmachus transcaucasicus Richter, 1962 و Dysmachus megrisiensis Richter, 1966 گونه‌های اولین بار از ایران گزارش می‌شوند. لیست هم‌گونه‌ها همراه با پراکنش جغرافیایی آن‌ها ارائه شده است. ویژگی‌های افتراقی و همچنین تصاویر تکمیلی گزارش‌های جدید ارائه شده است.

واژگان کلیدی: Asilidae، آذربایجان شرقی، آذربایجان غربی، ایران، گزارش جدید