Faunistic study of the subfamily Conopinae (Diptera: Conopidae) in Arasbaran forests, with two new records for Iranian fauna

Samad Khaghaninia1 and Farzaneh Kazerani2*

1. University of Tabriz, Faculty of Agriculture, Department of Plant Protection, Tabriz, Iran.
2. Young Researchers and Elite Club, Islamic Azad University, Tabriz Branch, Tabriz, Iran.

**Abstract:** The present paper deals with the fauna of the subfamily Conopinae in northwestern Iran. Specimens were collected, using insect net, from Arasbaran forest during 2010-2013. In total, six species belonging to two genera were identified, of which the two species, *Conops longiventris* Kröber, 1916 and *Physocephala laticincta* (Brulle, 1833), are new records from Iran. The diagnostic characters and supplementary photographs of the species are provided.

**Keywords:** Northwestern Iran, Conopinae, Conopidae, New records

**Introduction**

The subfamily Conopinae is divided into 11 tribes: Asiconopini, Brachycereini, Caenoconopini, Conopini, Gyroconopini, Microconopini, Neoconopini, Physocephalini, Pleurocerinellini, Siniconopini and Tropidomyiini (Gibson et al., 2012). The known larvae of all species are internal parasitoids of aculeate Hymenoptera. The female flies usually attack and deposit eggs on their hosts in flight (Clements, 1997). The adults are pollen and nectar feeder, and often bear a striking resemblance to certain vespid wasps and flower flies (Smith and Petterson, 1987).

The members of the subfamily Conopinae are usually of medium size with black and yellow coloration with waisted abdomens; elongated antennae with apical stylus; basally geniculate haustellum; long and acute cell cup; presence of female genital plate; with weakly developed ovipositor and anteroventrally directed terminalia.

Chvála (1961) reviewed Czechoslovak species of the subfamily Conopinae and Stuke (2005) studied the *Physocephala rufipes* species-group within Palearctic region. A contribution to the fauna of Conopinae in Iran was written by Hütinger (1978) with the description of *Leopoldius pontifex*. Becker and Stein (1913) described 7 species of the genus *Physocephala* from the Iranian provinces of Sistan-Baluchistan, Kerman and Khorasan. Kröber (1927) described *Melanosoma bella* Krober, 1927 from Iran and also reported *Physoscephala vitatta* (Fabricius, 1794) from northern Iran (Kröber, 1939). Three more species of *Brachycereaea brevicornis* (Loew, 1847), *Physocephala zaitevi* Zimina, 1979 and *Tropidomyia aureifacies* Kröber, 1915 were reported from this region (Stuke et al., 2008).

As the fauna of this subfamily in Iran has been poorly studied, the aim of the present work is a preliminary discussion on the zoogeography and fauna of Iranian conopids.

**Materials and Methods**

All specimens were collected by hand-netting from Arasbaran forest of East-Azerbaijan province during 2010-2013. In order to prepare the male genitalia, the post abdomen was removed and boiled in 10% KOH (potassium hydroxide) solution for 45-60 seconds, then
transferred into acetic acid for 10-20 seconds and later washed in distilled water. The genitalia was stored in 0.5 ml microwials containing glycerin. Morphological terminology mainly follows Chvála (1961) and Stuke (2005). All specimens are deposited in the Insect Museum of Tabriz University (IMTU). The general distribution for each species follows Pape and Thompson (2011) and Bei- Bienko (1988).

Results

In total six species belonging to two genera of the subfamily Conopinae were identified, of which Conops longiventris Kröber, 1916 and Physocephala laticincta (Brulle, 1833) are newly recorded from Iran. The species are listed alphabetically within genera.

Key to the studied species, adapted from Chvála, 1961:
1- Anterior cross vein (r-m) beyond middle of discal cell (dm), first posterior cell (r4+5) long; abdomen only slightly narrowed at base, second and third abdominal segments equal in length (Conops L.) (Figs. 1-12)………………..……..2 - Anterior cross vein (r-m) beyond second third of discal cell (dm), first posterior cell (r4+5) short; male abdomen clearly narrowed at base, second abdominal segment longer than third (Physcocephala Schiner) (Figs. 13-24)………………....
2- Body completely black with silvery marks, humeri and scutellum black, small species, usually 7-8 mm (Figs. 5-8)…………..………… P. laticincta (Brulle) - Body yellow or brownish, humeri yellow or reddish brown, usually larger species, 8mm…………………………………… 3 3- Body reddish brown with black marks; frons reddish yellow with reddish-brown marks (Figs. 9-12)……………….. C. vesicularis Linnaeus - Body yellow with black marks; frons entirely yellow, with only small blackish spot above antennae (Figs. 1-4) ……... 4- Pleura with silvery dusted stripe; face entirely yellow, first arist a segment obviously elongated; dark wing band occupies whole cell r1-r2 (Figs. 13-16)……………….. P. chrysorrhoea (Meigen) -Pleura without any silvery coloration……… 5- Face and frons entirely yellow, without any black mark; antennae longer than head; first aristal segment not elongated; femora entirely brown (Figs. 21-24)………….. vittata (Fabricius)

Conopinae
Genus: Conops Linnaeus 1758
Type species: Conops flavipes Linnaeus, 1758
Note. The genus Conops has traditionally been divided into a number of subgenera, including Conops s. s. Linnaeus, 1761 and Asiconops Chen, 1939; the species C. vesicularis belongs to the subgenus Conops and the species C. insignis Loew, 1848 and C. longiventris Kröber, 1916 belong to the subgenus Asiconops. Asiconops has recently been elevated to genus status (Gibson and Skevington, 2013).

Conops insignis Loew, 1848 (Figs. 1-4)
Material examined: (1♂): East Azerbaijan province, Aynali region (located just west of Arasbaran forests), 38°30' N, 46°37' E, 391m, 25.vi.2010; leg. S. Khaghaninia.
Distribution: Europe, North Africa, Turkey, Mongolia, Iran.
Diagnostic characters: Antennae dark brown, first segment yellowish brown (Fig. 4); face and frons entirely yellow, with small blackish spot above antennae (Fig. 4); proboscis about 1/5 times length of head, black, in middle part brown; wings hyaline, frontal margin with brownish band (Fig. 3); legs yellow (Fig. 2); tergites 1-4 with yellowish silver pollinose, margins black, other segments with gold yellow pollinose throughout (Fig. 1).

Conops longiventris Kröber, 1916 (Figs. 5-8)
Material examined: (1♀): East Azerbaijan province, Chichekli (located in west part of Arasbaran forests), 38°30.425'N, 46°37.0452' E, 1689m, 07.vi.2012; leg. S. Khaghaninia.
Distribution: Europe, New to Iran.
Diagnostic characters: Face and frons yellow (Figs. 5 & 8); Antennae black, 1st and 3rd segments on lower side slightly brownish (Fig. 2).
8); proboscis shining black, about twice the length of head (Fig. 8); Thorax black, humeri and pleura silvery pollinose (Figs. 5 & 6); Legs light brown, apical tibiae dark brown, tarsi black (Fig. 6); wings hyaline (Fig. 5); abdomen black, tergites with silvery pollinose distal margins (Fig. 5); theca large, shining black (Fig. 7).

**Conops vesicularis** Linnaeus, 1761 (Figs. 9-12)


*Distribution:* Europe, Russia, Middle East, North Africa, China, Iran.

*Diagnostic characters:* Frons reddish yellow in some parts reddish brown (Fig. 12); antennae reddish brown (Fig. 12); proboscis strong, only a little longer than head, blackish brown; mesonotum black, scutellum reddish brown (Fig. 9); legs reddish brown (Fig. 10); wings faintly yellowish, front margin with yellowish brown band (Fig. 9); abdomen predominantly gold yellow, only basal tergites with dark brown front margins (Fig. 9); male genitalia as in Fig. 11.

**Physocephala chrysorrhoea** (Meigen, 1824) (Figs. 13-16)


*Distribution:* Europe, North Africa, Russia to East Siberia, Mongolia, China, Iran.

*Diagnostic characters:* Face entirely yellow, antennae black, 2nd and 3rd segment brownish at base, first aristal segment obviously extended (Fig. 15); proboscis dark brown (Fig. 15); dark wing band occupies whole cell r1+2 (Fig. 16); Legs yellowish brown, tarsi greyish brown, tibiae with silvery luster (Fig. 14); Pleura with silvery stripe (Fig. 14); abdominal tergites black with brown and silver coloration (Fig. 13).

**Physocephala laticincta** (Brulle, 1833) (Figs. 17-20)


*Distribution:* Europe, North Africa, Turkey, Russia, Middle Asia, New to Iran.

*Diagnostic characters:* Face with black stripe extending from base of antennae for one-half its length, not interrupted (Fig. 19); antennae dark brown or black, first aristal segment on lower side prolonged (Fig. 19); proboscis black (Fig. 19); pleura without any silvery coloration; femora with black ring at base (Fig. 18); wings with brown marginal band (Fig. 17); abdomen black, posterior margins yellowish silvery pollinose, 2nd segment large and brownish, last segments nearly all yellowish pollinose (Figs. 17 & 18); male genitalia as in Fig. 20.

**Physocephala vittata** (Fabricius, 1794) (Figs. 21-24)


*Distribution:* Europe, North Africa, Middle East to Mongolia, China, Iran.

*Diagnostic characters:* Face and frons entirely yellow, without any black design (Fig. 23); antennae black, 3rd segment and distal part of second segment brownish longer than head (Fig. 23); proboscis slender, shining black (Fig. 23); wings with brown marginal band that do not reach end of cell R2 (Fig. 21); pleura without any silvery coloration (Fig. 22); abdominal tergites brownish with silvery pollinose (Figs. 21 & 22); male genitalia as in Fig. 24.

*Note.* Specimens of *Physocephala vittata* seem to be var. *abdominalis* Kröber, which is very common in southern Europe and the Middle East.

Kröber (1939) collected this species from Shahkouh village located in northern Iran. This area is covered by forests and has much the same conditions as the forests in the northwest of Iran.

**Discussion**

All of the studied species were collected from a forest area that has rich a fauna of Hymenoptera, so conopid flies as an agent of insect
endoparasitism could potentially have important economic and ecological impacts in such areas (Freeman, 1966; Mei, 1999). Further studies on the host range and biology of conopids should be made in this area, similar to the studies of Smith (1969), who gave details of the biology and hosts of British species, and also Schmid-Hempel and Schmid-Hempel (1990) in Switzerland who have published extensively on the relationships between Conopidae and bumble-bees (Hymenoptera: Apidae, Bombus spp.).

About 127 species of the genus Physocephala and 154 species of the genus Conops have been recognized in the world (Pape and Thompson, 2011). Nineteen species of this subfamily have been recorded to date from nearby Turkey (Stuke et al., 2008). Therefore it can be anticipated that many more species of this subfamily will be found in Iran, necessitating further studies on the fauna of this subfamily.


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References

Becker, T. and Stein, P. 1913. Persische Dipteren von den Expeditionen des Herrn N.


مطالعه مگس‌های زیرخانواده Conopinae (Diptera: Conopidae) در جنگل‌های ارساران به همراه گزارش جدید دو گونه از ایران

صد خاطئ‌نیا و فرزانه کازرانی

1- گروه گیاه‌پزشکی، دانشکده کشاورزی، دانشگاه تبریز، تبریز، ایران.
2- پژوهشگاه پژوهشگران جوان و نخبگان، واحد تبریز، دانشگاه آزاد اسلامی، تبریز، ایران.

* پست الکترونیکی نویسنده مسئول مکاتبه:
f.kazerani2000@yahoo.com

دریافت: 9 دی 1392؛ پذیرش: 26 اسفند 1392

چکیده: این تحقیق به مطالعه فون مگس‌های زیرخانواده Conopinae در شمال غرب ایران می‌پردازد.

نمونه‌ها توسط تور حشره‌گیری در طی سال‌های 1389-1391 از جنگل‌های ارساران واقع در استان آذربایجان شرقی جمع‌آوری گردیدند. در کل 6 گونه متعلق به 2 گونه متعلق به 2 گونه متعلق به 2 گونه Conops longiventris Krober, 1916 و Physocephala laticincta (Brulle, 1833) از ایران گزارش می‌شوند. محصولات افزایشی همراه با عکس‌های گونه‌های مطالعه شده ارائه شده است.

واژگان کلیدی: شمال غرب ایران، Conopinae، Conopidae