New records of the subfamily Phasiinae (Diptera: Tachinidae) from Iran

Ebrahim Gilasian1,2*, Ali Asghar Talebi2, Joachim Ziegler3, Shahab Manzari1 and Mehrdad Parchami-Araghi1

1 Insect Taxonomy Research Department, Iranian Research Institute of Plant Protection, Agricultural Research, Education and Extension Organization (AREEO), Tehran, 19395-1454, Iran.
2 Tarbiat Modares University, Faculty of Agriculture, Department of Entomology, 4115-336, Tehran, Iran.
3 Museum für Naturkunde, Leibniz Institute for Research on Evolution and Biodiversity, Invalidenstrasse 43, Berlin, 10115, Germany.

ABSTRACT. In a taxonomic study of the subfamily Phasiinae (Diptera: Tachinidae), seven species and the three genera Opesia Robineau-Desvoidy, Subclytia Pandellé and Xysta Meigen are recorded for the first time from Iran. The diagnostic characters, distributional data along with the photographs of species are presented. Taxonomical positions of the genera and species are discussed.

Key words: fauna, new records, taxonomy, biological control, parasitoids

Introduction

Phasiinae with about 600 species and 100 genera described worldwide is the smallest subfamily of the family Tachinidae (Herting 1984; Tschorsnig 1985; Herting and Dely-Draskovits 1993; Tschorsnig and Richter 1998; Ziegler 1998; Richter 2004; Blaschke 2015). The most recent evolutionary survey on the subfamily proved that the elongated hypandrium should be considered as a unique synapomorphy for the phasiine taxa (Blaschke 2015). Other traits such as piercer location (in case of presence), oviposition strategy, host and hinged membranous connection between basiphallus and distiphallus share among Phasiinae and some other subfamilies (Blaschke 2015). The following external morphological characters can be found in the subfamily Phasiinae: Eye, arista and prosternum bare; scutum with 0–2 postsutural intra-alar setae, in case of 2 setae they are widely separated from each other; middorsal depression on abdominal syntergite 1+2 not reaching posterior margin; abdominal sternites often well exposed (Tschorsnig and Richter 1998).

The subfamily Phasiinae has been a subject of taxonomic studies through the years largely for its economically important hosts and amazing parasitic strategies. Draber-Mońko (1961, 1964) studied the subfamily Phasiinae in Poland and wrote an identification key to the species. Meanwhile, Dupuis (1963) provided a monograph on...
the subfamily Phasiinae. In line with the previous studies on Old World species of Tachinidae, Herting (1983) revised the genera *Lophosia* Meigen and *Cylindromyia* Meigen in tribe Cylindromyiini (Phasiinae) and compiled the catalogue of the family in the Palaeartic region (Herting 1984). Later, Tschorsnig (1985) classified phasiine tribes according to the structure of male terminalia leading to the exclusion of the tribe Eutherini. Tschorsnig and Herting (1994) provided a key to the species of Central Europe and defined the host ranges of species and their ecological importance. Ziegler and Shima (1996) studied the Russian Far East Tachinidae and presented 61 phasiine species with their ecological, morphological and zoogeographical data in addition to the description of the new species *Hemyda hertingi*. Ziegler (1998) investigated the morphology of puparia and cephalo-pharyngeal skeleton of mature larvae of four subfamilies of Tachinidae. In her faunistic study of the tachinid flies of the Russian Far East, Richter (2004) compiled a key to the Phasiinae species of this region. O’Hara (2013) reviewed the history of classification of Tachinidae including the subfamily Phasiinae from Meigen until now. The phylogeny of Tachinidae has been recently analyzed by using 135 morphological characters of 492 species in four subfamilies including Phasiinae (Cerretti et al. 2014). Their analysis supported the monophyly of the subfamily Phasiinae and its close relation to the subfamily Dexiinae. Blaschke (2013, 2015) studied the evolutionary phylogeny of the subfamily Phasiinae using molecular markers and presented a key to the species of eastern Nearctic region.

In our ongoing surveys on the Iranian fauna of Phasiinae; we studied the genera *Phania* Meigen, *Phasia* Latreille, tribe Leucostomatini and the genus *Cylindromyia* Meigen resulting in the description of the species *Phania rufomaculata* Gilasian and Ziegler, *Cylindromyia vallicola* Ziegler and Gilasian and *C. uncinata* Gilasian, Talebi and Ziegler (Gilasian et al. 2013a; 2013b; 2014a; 2014b). Gheibi et al. (2008, 2009) recorded five species of Phasiinae from Fars province and Seyyedi Sahebari et al. (2016) discovered five Phasiinae species from northwestern Iran.

**Material and methods**

The specimens have been collected by standard insect nets and Malaise traps since 1971. The Malaise traps were set up in northern slope of central Elburz Mountains. Pinned specimens were photographed using a 650D Canon digital camera and the photos of live specimens were taken with a Canon camera EOS 500D, Canon macro lens EF 100 mm, and a Canon macro ring lite MR-14EX. The specimens are deposited in the Hayk Mirzayans Insect Museum (HMIM), Tehran, Iran; Museum of Natural History, Leibniz-Institute for Research on Evolution and Biodiversity, Berlin, Germany (ZMHB) and the Collection of Department of Entomology, Tarbiat Modares University (TMUC), Tehran, Iran. The terminology for the external morphology follows Merz and Haenni (2000), Stuckenberg (1999) and Tschorsnig and Richter (1998). The identifications were done using Draber-Mońko (1964), Zimin (1966), Kugler (1977), Zimin et al. (1989), Tschorsnig and Herting (1994), Tschorsnig and Richter (1998) and Richter (2004).

**Results**

We present here three genera (*Opesia* Robineau-Desvoidy, *Subclytia* Pandellé, *Xysta* Meigen) and seven species of Phasiinae for the first time from Iran. The species are alphabetically ordered.

**Genus Catharosia Rondani, 1868**

**Type species.** *Thereva pygmaea* Fallén, 1815

**Remarks:** The genus *Catharosia* Rondani was first recorded from Fars province in

*Catharosia claripennis* Kugler, 1977

**Material examined:** IRAN. Elburz province, Karaj, 35°46′33.6″N, 50°57′14.9″E, 1278 m, 5–15.viii.2010, Malaise trap, 1♀ [TMUC], leg. M. Khayrandish and A. Nadimi; Gilan province, Roudsar, Rahimabad, Orkom, 36°46′13.9″N, 50°18′19.8″E, 1201 m, 22–31.vi.2010, Malaise trap, 1♂ [TMUC], leg. M. Khayrandish and A. Nadimi; Tehran province, Shahryar, 35°40′51.0″N, 50°57′24.9″E, 1168 m, 1–8.x.2010, Malaise trap, 2♂ 2♀ [TMUC], leg. M. Khayrandish and A. Nadimi.


**Host:** Unknown.

**Diagnosis:** Frons in male narrow and without fronto-orbital setae, at most as wide as postpedicel; palpus well developed, wing predominantly hyaline; upper calypter white to light brown; lower calypter brownish-black; petiole of wing cell R₄₊₅ 1.5–2 times as long as vein M beyond bend. Female: abdomen without a ventral strong process; ovipositor curved; cerci not exceeding half length of ovipositor.

**Remarks:** Although the colouration of upper calypter was used by Kugler (1977) to separate *C. pygmaea* from *C. claripennis*, we found this character unreliable and subject to intraspecific variation from white to light brown in both species. The pregonite and postgonite along with the aedeagus of *C. pygmaea* were illustrated by Tschorsnig (1985) (see Fig. 143 page 47; Fig. 229 page 66). The drawings of head and wing appeared in Richter (2004) (see Figs 180, 1–2 page 385). Draber-Moniko (1964) prepared the drawings of male and female terminalia (see Figs 123–124 page 52).

**Genus Eliozeta** Rondani, 1856

**Type species:** *Tachina pellucens* Fallén, 1820

**Remarks:** Based on the characters of male terminalia, Tschorsnig (1985) placed *Eliozeta* in the tribe Gymnosomatini and a recent phylogenetic study on the subfamily confirmed its placement (Blaschke 2015).
Figure 1. *Eliozeta pellucens* (female).

**Eliozeta pellucens** (Fallén, 1820)  
(Fig. 1)

**Material examined:** IRAN. Mazanderan province, Kandovan, Elburz Mountains, north of Tehran, 36°10′20.8″N, 51°18′55.8″E, 2570 m, 12.vii.2008, on flowers of *Achillea setacea* Waldst. and Kit. 1♂, 1♀ [ZMHB], leg. J. Ziegler; Ramsar, Eshkatechal, 1200 m, 26.v.2003, 2♂ [HMIM], leg. E. Gilasian.

**Distribution:** Asia. Russia (Far East), Transcaucasia. Europe. Widely spread from Central Europe northwards to Sweden and Finland and southwards to Spain and Italy (Herting and Dely-Draskovits 1993; Ziegler and Shima 1996; Richter 2004; Tschorsnig et al. 2016). New record for Iran.

**Hosts:** *Sehirus bicolor* (Linnaeus, 1758), *Cydnus aterrimus* (Forster, 1771) (Hemiptera: Cydnidae) (Tschorsnig and Herting 1994), *Homalogonia confusa* Kerzhner, 1972 (Hemiptera: Pentatomidae) (Richter 2004).

**Diagnosis:** Scapes nearly touch each other; postpedicel 2.1–2.5 times as long as pedicel; arista thickened in its basal 2/3.

**Remarks:** Draber-Mońko (1964) illustrated female terminalia and wing of *E. pellucens* (see Fig. 268 page 92, Fig. 271 page 93).

**Genus Gymnosoma** Meigen, 1803

**Type Species:** *Musca rotundata* Linnaeus, 1758

**Gymnosoma rungsi** (Mesnil, 1952)  
(Figs 2 A–B)

**Material examined:** IRAN. Chaharmahal & Bakhtiari province, Chelgerd, Goukanak, 2200 m, 2.vii.2004, 2♂ [HMIM], leg. E. Gilasian; Goukanak, northwest of Shahr-e Kord, valley, 32°33′10.8″N, 50°19′54.6″E, 2200 m, 03.vii.2004, on flowers of *Euphorbia* sp. 4♂ [ZMHB], leg. J. Ziegler; East Azarbaijan province, Mianeh, Bochoghliou, 1500 m, 24.v.2004, 1♀ [HMIM], leg. E. Gilasian; Esfahan province, Kashan, Nyasar, Aznaveh, 34°05′51.9″N, 51°00′04.0″E, 2132 m, 19.v.2009, 2♂, 1♀ [HMIM], leg. E. Gilasian; Golestan province, Maraveh Tappeh, Chenaran, 950 m, 07.x.2000, 1♀ [HMIM], leg. E. Gilasian; Kerman province, Baft, Qaleh Asgar, 29°30′13.0″N, 56°38′19.4″E, 2740 m, 06.v.2007, 6♂, 3♀ [HMIM], leg. E. Gilasian; Qohroud Mountains, valley, south of Qaleh Asgar, Lalehzar Mountains, camp, 29°30′13.0″N, 56°38′19″E, 2740 m, 03.v.2007, on flowers of endemic *Zosima radians* Boiss. and Hohen. 4♂, 1♀ [ZMHB], leg. J. Ziegler; same data as...
previous except 04.v.2007, on flowers of *Hertia intermedia* (Boiss.), 2♂, 1♀; Khorasan-e Razavi province, Mashhad, Bahreh, 36°41′07.0″N, 59°36′12.0″E, 26.v.2006, 1♂, 1♀ [HMIM], leg. E. Gilasian; Lorestan province, Doroud, Saravand, 36°41′07.0″N, 59°36′12.0″E, 26.v.2006, 1♂, 1♀ [HMIM], leg. E. Gilasian; Aligoudarz, Tiran, 2200 m, 30.vi.2004, 1♂, 1♀ [HMIM], leg. E. Gilasian; Saravand, Oshtoran Kuh, southeast of Doroud, east of Khorramabad, 36°22′33.6″N, 59°36′12.0″E, 26–27.vi.2004, on flowers of *Bupleurum kurdicum* Boiss. 5♂, 1♀ [ZMHB], leg. J. Ziegler; Tiran, south of Aligoudarz, east of Khorramabad, valley, 33°11′21.1″N, 49°47′50.0″E, 2350 m, 29.vi.2004, on flowers of a white Apiaceae, 1♂ [HMIM], 8♂, 2♀ [ZMHB], leg. J. Ziegler; Qazvin province, valley, south of Ab Garm, 200 km west of Tehran, 35°47′47.6″N, 49°22′46.6″E, 1500 m, 21.vi.2004, on flowers of *Euphorbia* sp. 1♂ [ZMHB], leg. J. Ziegler; Tehran province, Tehran, Evin, 1.vii.1971, light trap 1♂ [HMIM].


**Hosts:** *Aelia rostrata* Boheman, 1852 (Hemiptera: Pentatomidae), *Eurygaster maura* (Linnaeus, 1758) (Hemiptera: Scutelleridae) (Kara and Tschorsnig 2003).

**Diagnosis:** Frons in female without fronto-orbital setae; eyes nearly touch each other at frons; lower facial margin well visible in lateral view; vibrissa well developed, arising above level of lower facial margin; scutellum with three pairs of marginal setae; anatergite with a patch of minute setulae below lower calypter; wing cell $R_{4+5}$ closed or narrowly open at wing margin.

**Remark:** The genus *Opesia* is newly recorded from Iran.

Based on the male terminalia, Tschorsnig (1985) and Cerretti et al. (2014) treated *Opesia* in the tribe Phasiini. Recent molecular analyses found *Opesia* closely aligned with the tribe Strongygastrini rather than the Phasiini Blaschke (2013).
Figure 2. Gymnosoma rungsi on flowers of Zosima radians. A. Male. B. Female. Photo by J. Ziegler.
He also resurrected Mesnil’s (1966) tribe Opesini which was proposed on the basis of reduced abdominal sternite 8 in females.

**Opesia cana** (Meigen, 1824)  
(Fig. 3A)

**Material examined:** IRAN. Mazandaran province, Pole sefid, Anarum, 36°02′13.2″N, 53°09′35.4″E, 1400 m, 08.vi.2006, 1♀ [HMIM], leg. E. Gilasian.

**Distribution:** Asia: Mongolia, Russia (Far East). Europe: It is widely distributed in Europe (Herting and Dely Draskovits 1993; Ziegler and Shima 1996; Tschorsnig et al. 2016). New record for Iran.

**Host:** Unknown.

**Diagnosis:** Frontal setae extending at most to anterior margin of scape, vertical setae well differentiated from postocular row; scutum with three median black presutural stripes, central stripe in female sometimes vague; katepisternum mostly with 2 setae; basicosta blakish-brown; claws of fore leg in male nearly as long as tarsomeres 4+5 together; sternite 7 in female shiny black and shorter than sternite 6.

**Remarks:** The central European species of Opesia including *O. cana* were examined by Tschorsnig and Herting (1994) who provided an identification key to the species in this region and illustrated the head of *O. cana* (see Fig. 58 page 103). Draber-Mońko (1964) and Zimin et al. (1989) illustrated the terminalia as *Xysta cana* (see Figs 201, 203 page 72 in Draber-Mońko 1964; Figs 935, 2 page 1295 in Zimin et al. (1989)).

**Genus Subclytia** Pandellé, 1894

**Type species:** *Tachina rotundiventris* Fallén, 1820

**Diagnosis:** Antenna, scutellum and legs predominantly yellow; gena at least 1/4 times as long as vertical diameter of eye; scutum with one pair of presutural dorsocentral and one pair of postsutural intra-alar setae; postpronotum with 2–3 setae; wing hyaline; wing cell R4+5 open; abdomen generally yellowish orange, with or without median triangular black maculae on posterior margin, tergites 4–5 with marginal setae.

**Remarks:** This is the first record of the genus *Subclytia* from Iran. This genus has been treated as a member of the tribe Gymnosomatini by Blaschke (2015).

**Subclytia rotundiventris** (Fallén, 1820)  
(Fig. 3B)

**Material examined:** IRAN. Mazandaran province, Ramsar, Eshkatechal, 36°50′47.8″N, 50°33′28.5″E, 1500 m, 13.vii.2008, 1♂, 1♀ [HMIM], leg. E. Gilasian; Eshkatechal, Elburz Mountains, southwest of Ramsar, forest station, 36°50′46.3″N, 50°33′34.4″E, 1220 m, 13.vii.2008, on leaves, 1♀ [ZMHB], leg. J. Ziegler., same data as previous except, 36°50′32.3″N, 50°35′07.2″E, 1570 m, 14.vii.2008, 1♂.

**Distribution:** Asia. Mongolia, Russia (Far East), Transcaucasia. Europe. Widely distributed in mainland Europe except Iberian Peninsula in the west, Balkan Peninsula, Belarus and Lithuania in the east (Herting and Dely Draskovits 1993; Ziegler and Shima 1996; Richter 2004; Tschorsnig et al. 2016). New record for Iran.

**Hosts:** *Elasmucha grisea* (Linnaeus, 1758), *Elasmostethus interstinctus* (Linnaeus, 1758), *Cyphostethus tristriatus* (Fieber, 1860) (Hemiptera: Acanthosomatidae), *Piezodorus lituratus* (Fabricius, 1794) (Hemiptera: Pentatomidae) (Tschorsnig and Herting 1994).

**Diagnosis:** Monotypy of the genus *Subclytia* includes the generic diagnostic characters at the species level for *S. rotundiventris*.

**Remarks:** Draber-Mońko (1964) made illustrations of the wing along with male and female terminalia of *S. rotundiventris* (see Figs 208–211 page 75). Tschorsnig (1985) illustrated the male terminalia of this species (see Fig. 47 page 25).
Figure 3. A. *Opesia cana* (female). B. *Subclytia rotundiventris* (female). Photo by J. Ziegler.
Figure 4. *Xysta holosericea*. A. Male. B. Female.
Genus **Xysta** Meigen, 1824

**Type species:** *Xysta cilipes* Meigen, 1824  
**Diagnosis:** Scutum with one pair of postsutural dorsocentral setae, lacking postsutural intra-alar setae; postpronotum with one seta; wing cell R₄+₅ open; male and female terminalia distinctly asymmetrical; piercer corkscrew shaped (not straight) and derives from abdominal sternite 8.  
**Remarks:** The genus *Xysta* is recorded for the first time from Iran. Blaschke (2013, 2015) has resurrected the tribe Xystini Lioy including a single genus *Xysta*. This genus was formerly placed in the tribe Phasiini.

**Xysta holosericea** (Fabricius, 1805)  
(Figs 4 A–B)  
**Diagnosis:** *Xysta* is a monotypic genus and all morphological characters for the genus are referred to the species *Xysta holosericea*.  
**Material examined:** IRAN. Chaharmahal & Bakhtiari province, Ardal, Absard, 1900 m, 21.viii.1995, 1♀ [HMIM], leg. H. Mirzayans/M. Badii., Sabzkuh, 2500 m, 02.vii.2004, 2♂ [HMIM], leg. E. Gilasian; Kerman province, Baft, Qaleh Asgar, 29°30′13.0″N, 56°38′19.4″E, 2740 m, 03.v.2007, 1♂, 1♀ [HMIM], leg. E. Gilasian.  
**Distribution:** Asia. Israel. Europe. Mostly occur in the Mediterranean countries eastwards to Romania (Herting and Dely Draskovits 1993; Tschorsnig et al. 2016). New record for Iran.  
**Host:** Unknown.  
**Remarks:** The illustrations for the male terminalia were provided by Tschorsnig (1985) (see Figs 8 page 10, 98 page 40). Zimin et al. (1989) illustrated the head, wing and terminalia of female as *Kiritschenkia holosericea* (see Figs 934, 1–3 page 1294).

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گزارش‌های جدید از مگس‌های زیرخانواده <em>(Diptera: Tachinidae) Phasiinae</em> در ایران

ابراهیم گیلاسیان ۱، ۲، ۳، طالبی اصغری ۴، شهراب منظری ۵ و مهرداد پرچمی عراقی ۶

یک بخش تحقیقات رده‌بندی حشرات، موسسه تحقیقات گیاه‌پزشکی کشور، سازمان تحقیقات، آموزش و ترویج کشاورزی، صندوق پستی ۱۴۵۴-۱۳۸۵، تهران، ایران.

۲ گروه حشره‌شناسی، دانشکده کشاورزی، دانشگاه تربیت مدرس، صندوق پستی ۱۴۱۲-۱۳۸۶، تهران، ایران.

۳ موزه تاریخ طبیعی، موسسه تحقیقات تکامل و تنواع زیستی برلین، آلمان.

gilasian@iripp.ir

پیست الکترونیکی نویسنده مسئول مکاتبه:

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چکیده: طی بررسی تاکسونومیک مگس‌های زیرخانواده <em>Subclytia</em>, <em>Opesia</em> روبین دس‌وید (سرد تاکسونویسی Tachinidae) برای اولین بار از ایران گزارش می‌شود. صفات افتراقی، پراکندگی گونه‌ها به همراه تصویرهای رنگی آنها ارایه می‌شوند. موقعیت تاکسونومیکی جنس‌ها و گونه‌ها بحث شد.

واژگان کلیدی: فون، گزارش جدید، تاکسونومی، مبارزه بیولوژیک، پارازیتوی