

## The first report of three genera and six species of rust flies (Diptera: Psilidae) from Iran

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**Abstract.** Based on specimens collected from East Azerbaijan province during 2009-2013, six species belonged to four genera were recognized to occur in this region. Three genera and six species were recorded from Iran for the first time. Photos of adult habitus and key to the Iranian species of the rust flies are provided.

**Key words:** Rust flies, Psilidae, New records, East Azerbaijan province, Iran.

### Introduction

The Psilidae is a small family of the acalyptate Diptera from superfamily Diopsoidea with about 400 described species belongs to three subfamilies (Belobackenbardia, Chylizinae and Psilinae) (Freidberg & Shatalkin 2008).

The external morphology of the most Psilidae is rather remarkable that allows easily distinguishing them in a sweeping net from other flies by Conical-like habitus, more or less smooth, hairless, shiny and slender body in reddish to black or yellow coloration. Morphologically it differs from the closest families of superfamily Diopsoidea by the following combination of characters: Small to medium size, antennal segment 2 with narrow dorsal slit in distal margin, segment 3 deflexed at an angle to basal segments, ptilinal fissure well developed with descending lateral arms, vein C with a distinct break at level of distal end of vein Sc,  $CubA_{1+2}$  not reaching to lower margin of wings, pronotum very short, notopleuron with one bristle, anepisternum without a bristle with fine setulae only, ocelli situated near vertex with the anterior one on dorsal third of frons (McAlpine 1997, Freidberg & Shatalkin 2008).

Biologically, the larvae of Psilidae are phytophagous. Most psilid larvae live in roots, stems or tubers of different plants. Some species of rust flies are pest of crops. Carrot rust fly (*Chamaepsila rosae* (Fabricius, 1794)) is an agricultural pest of Carrot that larvae live in roots (Freidberg & Shatalkin 2008, Bygebjerg et al. 2011).

Shatalkin (1986) reviewed Palaearctic species of *psila* s.l. Goot (1996) prepared keys to the family Psilidae in North-west of Europe. Iwasa (1998) prepared keys to genera Psilidae in Palaearctic region. The first contribution to the fauna of Psilidae in Iran including (*Chamaepsila atra* (Meigen, 1826), *Ch. nigricornis* (Meigen, 1826), *Ch. rosae* (Fabricius, 1794) and *Chyliza leptogaster* (Panzer 1798)) was made by Khaghaninia & Gharajedaghi (2014). Also Khaghaninia & Gharajedaghi (2014b) described *Chyliza (Dasyna) qaradaghi* from Iran. Nevertheless, the rust flies of Iran are poorly known, with 4 species in 2 genera belonging to two subfamilies (Chylizinae and Psilinae). The present paper increases the faunal list of Iran to 10 species.

### Materials and methods

This paper is based on dipterous specimens collected during annual sampling programs of the Insect Museum of Tabriz University in northern west of Iran. Six species of Psilidae found in the IMTU that

collected during 2009-13. However, collection label data of the specimens are quoted.

Body length is measured from the base of the antenna to the tip of abdominal segment 7. The size of scale on figures is one millimeter.

Below locality and label data are quoted from collectors that found in the IMTU collection.

*Chyliza extenuata* (Rossi, 1790): 2♂, 3♀, Qaradag forests, 38°51' N, 46°52' E, 1770 m a.s.l., 20 June 2011, coll. Vosogh, Khaghaninia and Shakeryari (by sweeping net).

*Loxocera aristata* (Panzer, 1801): 1♂, Maraghe, 37°25' N, 46°25' E, 1787 m a.s.l., 25 April 2009, coll. Vosughian (by sweeping net); 1♂, 3♀, Kandovan, 37°42' N, 46°18' E, 2863 m, 5 September 2010, coll. Gharajedaghi, Khaghaninia and Zarghani (by sweeping net); 3♂, 4♀, Horand, 38°59' N, 47°22' E, 1370 m a.s.l., 10 June 2011, coll. Khaghaninia (by sweeping net); 2♀, Isperekhan, 37°46' N, 46°24' E, 2504 m a.s.l., 8 August 2011, coll. Khaghaninia (by sweeping net); 2♂, 4♀, Qaradag forests, 38°53' N, 46°48' E, 1859 m a.s.l., 26 July 2012, coll. Khaghaninia (by malaise trap); 1♀, Kandovan, 37°46' N, 46°15' E, 2341 m, 25 June 2013, coll. Zamani, Kazerani and Khaghaninia (by sweeping net).

*Oxypsila abdominalis* (Schummel, 1844): 1♂, 1♀, Chichekli, 38°38' N, 46°14' E, 1429 m a.s.l., 29 June 2009, coll. Khaghaninia and Zarghani (by sweeping net).

*Psila caucasica* Mik, 1877: 1♂, 2♀, Qaradag forests, 38°53' N, 46°48' E, 1859 m a.s.l., 15 June 2013, coll. Khaghaninia (by sweeping net); 2♂, 2♀, Kandovan, 37°46' N, 46°15' E, 2341 m, 25 June 2013, coll. Khaghaninia, Zamani and Kazerani (by sweeping net).

*Psila fimetaria* (Linnaeus, 1761): 1♂, 1♀, Qurigol, 37°55' N 46°41' E, 1915 m a.s.l., 4 August 2009, coll. Khaghaninia and Zarghani (by sweeping net); 1♂, Ajabshir, 37°31' N, 46°07' E, 1662 m a.s.l., 10 April 2010, coll. Gharajedaghi (by sweeping net); 2♂, 3♀, Qurigol, 37°54.975' N 46°41.120' E, 1943 m a.s.l., 9 July 2011, coll. Gharajedaghi and Khaghaninia (by sweeping net).

*Psila pallida* (Fallen, 1820): 1♂, 1♀, Kandovan, 37°45' N, 46°18' E, 2844 m, 24 May 2013, coll. Khaghaninia (by sweeping net).

### Results

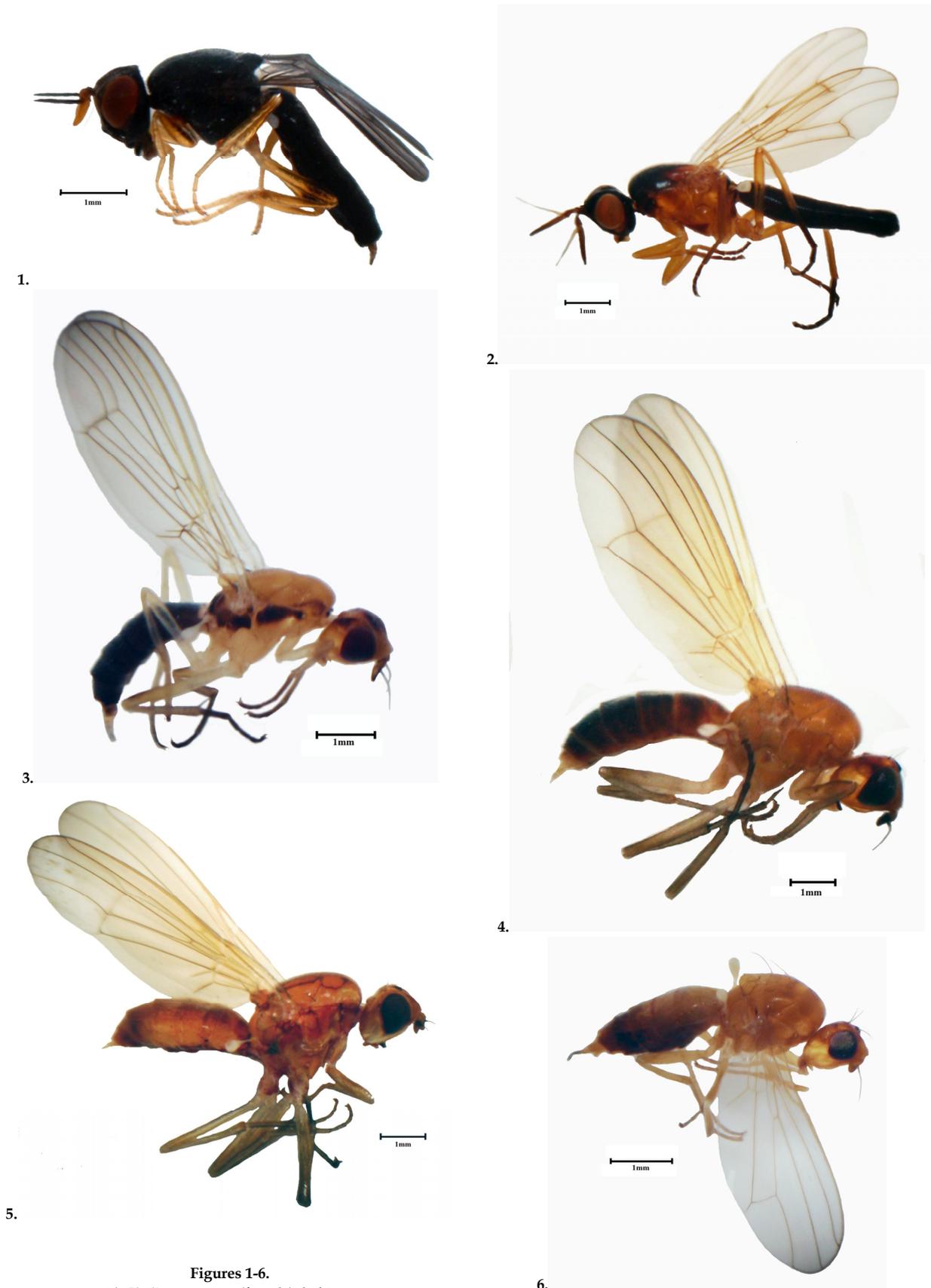
In this study, six species belong to four genera were collected from the East Azerbaijan province of Iran. Three genera and six species are recorded from Iran for the first time. Species are listed in alphabetic order.

#### Subfamily Chylizinae

##### Genus *Chyliza* Fallen 1820

##### *Chyliza extenuata* (Rossi, 1790) (Fig. 1)

**Diagnostic characters:** This species differing from other species of the subgenus *Dasyna* with these characters: Arista with dense black rays, head mainly black, hind femur some-



**Figures 1-6.**

- 1.) *Chyliza extenuata* (female), habitus.
- 2.) *Loxocera aristata* (male), habitus.
- 3.) *Oxypsila abdominalis* (female), habitus.
- 4.) *Psila caucasica* (female), habitus.
- 5.) *Psila fimetaria* (female), habitus.
- 6.) *Psila pallida* (female), habitus.

times with black apical spot, hind tibia without black area in apical half (Freidberg & Shatalkin, 2008).

Comments: The Genus *Chyliza* Fallen contains two subgenera (*Chyliza* and *Dasyina*). Subgenus *Dasyina* can be distinguished from all other species of the genus *Chyliza* (s. g.

*Chyliza*) by thickened arista having dense black rays that contain one species (*Ch. extenuata* (Rossi)). Authors found an undescribed species of the subgenus *Dasyina* from East Azerbaijan province that differing from *Ch. extenuata* by head having yellow coloration, hind femur and hind tibia with black area in apical half and smaller size.

**Distribution:** Central and southern Europe, Middle East and Turkmenistan (Freidberg & Shatalkin, 2008). New record for the Iran insect fauna.

**Host plants:** The larvae live in the swollen underground part of *Orobancha* spp. (Orobanchaceae) (Chandler 1975).

### Subfamily Psilinae

#### Genus *Loxocera* Meigen, 1803

*Loxocera aristata* (Panzer, 1801) (Fig. 2)

**Diagnostic characters:** This species is similar to *L. glandicula* Iwasa, 1993 and differ from it as well as other Palaearctic species of this genus by these characters: Ventral surface of hind femur with a patch of dens, felt-like microtomentum in distal half. Frontal vitta largely velvety and dull, desclerotized. Alula bare except margin. Face entirely black (Matthias & Marshall 2006, Freidberg & Shatalkin 2008).

**Distribution:** West Palaearctic, as far as Ural and Caucasus (Freidberg & Shatalkin 2008). New record for the Iran insect fauna.

**Host plants:** Host plants of most species of Psilidae are unknown, but some Nearctic species of *Loxocera* attack to stems of the sedge (*Carex interior* Bailey) (Valley et al. 1969) and Palaearctic *L. albisetia* (Schrank 1803) was reared from stems of *Juncus effusus* L. (De Meijere 1941).

**Comments:** In this research, *Loxocera aristata* were collected from semi-aquatic patch of Maraghe, Kandovan and Isperkhan regions. These areas have rich grasslands with various species of Asteraceae, Cyperaceae, Juncaceae, Lamiaceae, Plantaginaceae, Poaceae and Ranunculaceae and semi-aquatic area of this regions covered by species of the family Cyperaceae, Juncaceae and sometimes Ranunculaceae.

#### Genus *Oxyopsila* Frey 1925

*Oxyopsila (Psila) abdominalis* (Schummel, 1844) (Fig. 3)

**Diagnostic characters:** This genus differing with similar species by these characters: Antennal stylus rarely pale pubescent, Antennal postpedicel mainly yellow, darkened in dor-

sal sides and apex, palpi yellow, fore basitarsus with ventral rows of pale setae, ocellars triangle and abdomen dark brown, notum mainly yellow, notopleural with dark patch, legs mainly yellow with dark tarsus. Genus *Oxyopsila* closely related to the genus *psila* and differing by lack dorsocentral (prescutellar acrostical) bristles (Matthias & Marshall 2006, Freidberg & Shatalkin 2008).

**Distribution:** Slovakia, Romania and Turkey (Ceianu 1989, Stary 2009). New record for the Iran insect fauna.

**Host plants:** Host plants of most species of Psilidae are poorly known and host rang of this species is premature.

#### Genus *Psila* Meigen, 1803

*Psila caucasica* Mik, 1877 (Fig. 4)

**Diagnostic characters:** This species is similar to *P. fimetaria* (L., 1761) and *P. merdaria* Collin, 1944 and differing with them by these characters: Antennal postpedicel entirely black, abdomen dark brown.

**Comments:** Distribution and host of most species of Psilidae are poorly known and discussion about host rang and zoogeography of this species is premature. New record for the Iran insect fauna.

*Psila fimetaria* (L., 1761) (Fig. 5)

**Diagnostic characters:** This species is similar to *P. merdaria* Collin, 1944 and differing with that by these characters: Third antennal joint darkened on the outer side about the base of the arista, hairs beneath the second antennal joint longer.

**Distribution:** A very common European species (Stary 2009). New record for the Iran insect fauna.

**Host plants:** *Carex* spp. (Stary 2009).

*Psila pallida* (Fallen, 1820) (Fig. 6)

**Diagnostic characters:** This species differing from related similar species by these characters: body 4.5-5 mm, and yellow, antenna and palpi yellow, body with white microtomentous setulae.

**Comments:** Distribution and host of most species of Psilidae are poorly known and discussion about host rang and zoogeography of this species is premature. New record for the Iran insect fauna.

### Key to the Iranian species of the family Psilidae (adapted from Matthias & Marshall 2006, Shatalkin 2008)

1. Postpedicel elongate; 8-8/5..... *Loxocera aristata* (Panzer) 2
- Postpedicel normal..... 3
2. Cellcup shorter than cell bm..... 3
- Cellcup approximately as long as cell bm..... 4
3. arista with dense black rays; 4/5-5..... *Chyliza extenuata* (Rossi) 4
- arista without dense black rays; 5..... *Chyliza leptogaster* (Panzer) 5
4. Body mainly yellow..... 5
- Body mainly black..... 8
5. Pleural with distinct dark brown area; 5/5-6..... *Oxyopsila abdominalis* (Schummel) 6
- Pleural entirely yellow..... 6
6. Postpedicel entirely black; 7/5-8..... *Psila caucasica* Mik 7
- Postpedicel mainly yellow..... 7
7. Postpedicel joint darkened on the outer side about the base of the arista; 8..... *Psila fimetaria* (L.) 8
- Postpedicel entirely yellow; 4-4/5..... *Psila pallida* (Fallen) 8

8. Femora black, 3/5-4.....*Chamaepsila atra* (Meigen)  
 — Femora yellow.....9
9. Postpedicel joint partly yellow; 4/5-5.....*Chamaepsila rosae* (Fabricius) (in part)  
 — Postpedicel joint black.....10
10. Eyes rather larger and not so round, arista and abdominal pubescence slightly longer.....*Chamaepsila rosae* (Fabricius)  
 — Eyes rather smaller and round, arista and abdominal pubescence rather shorter; 4/5-5.....*Chamaepsila nigricornis* (Meigen)

## Discussion

The Iranian fauna of Psilidae is poorly known with 10 species in 5 genera belonging to two subfamilies (Chylizinae and Psilinae). Psilidae have worldwide distribution but are mainly Holarctic (Stary 2009). Therefore, the real number of Iranian psilids may reach more than 30 species following special expeditions covering a wider geographical area of the country. For comparison, more than 50 species occurring in European part of Holarctic ecozone (Oosterbroek 2006) and more than 25 species are known for the Netherlands (Beuk & Goot 2002). Thus, a discussion on the zoogeography of Iranian psilids' fauna is needed to further studies.

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