Taxonomic study of the genus Meromyza Meigen, 1830 (Diptera: Chloropidae) in Shabestar region with two species as new records for the Iranian fauna

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Abstract. Based on the collected specimens from Shabestar region located in East Azerbaijan during 2013-2014, eight species of the genus Meromyza Meigen, 1830 were recognized which among them, M. filippovi Ozerov, 2009 and M. ornata (Wiedemann, 1817) are reported as new records to the Iranian insect fauna. A key to the studied species along with their diagnostic characters, geographical distribution and supplementary figures are given.

Key words: Chloropidae, Meromyza, Iran, Shabestar, new records.

Introduction

The family Chloropidae, commonly named grass flies, has 204 genera and more than 2500 described species belongs to 4 subfamilies (Siphonellospinae, Rhodiesillinae, Oscinelli-nae, Chloropinae) are a fairly large family of Acalyptratae flies (Nartshuk 2012). The frit flies of the genus Meromyza Meigen, 1830 belong to the subfamily Chloropinae which has 95 species in the Holarctic region, 67 of which are identified from Palaeartic and 23 of them are from Nearctic Region and the rest are found in other zoogeographical regions. Larvae of this genus are considered as pests of several species of poaceous plants, including the wheat, rye, and barley (Nartshuk & Fedoseeva 2011a). The main characteristics of these flies are as follow: yellowish and greenish elongated body, except of the subgenus Nippomera Fedoseeva et Nartshuk, 1983 which has a completely black body; the mesonotum with black, brownish or rufous longitudinal stripes; head square with short setae; ocellar triangle with a black ocellar tubercle and black spots; the hind femur is thickened with two rows of black spines ventrally, the hind tibia is curved accordingly; wing veins R2+3 and R4+5 are curved sharply towards its anterior margin (Nartshuk et al. 1988, Nartshuk & Fedoseeva 2011a, Nartshuk & Andersson 2013). The presence of a wide phenotypic plasticity in the genus like seasonal as well geographical colorations make some difficulties in their identifications (Nartshuk & Fedoseeva 2011a).

In the nearest studies, Ozerov (2009) described Meromyza filippovi Ozerov from the European part of Turkey, Nartshuk & Fedoseeva (2011a, b) reviewed the genus Meromyza in the Palaeartic region, Nartshuk (2011- 2012) studied the chloropids of Turkey and described the Meromyza turcica Nartshuk. Nartshuk & Andersson (2013) published a comprehensive book entitled “The Frit Flies (Chloropidae, Dip-tera) of Fennoscandia and Denmark” about this family and, Safonkin et al. (2013) studied the distribution of the genus Meromyza in Vologda Oblast and East Poland.

Before this study 19 species of the genus Meromyza had been identified from Iran (Behdad 1982, Rajabi et al. 1997, Nartshuk & Fedoseeva 2011b, Khaghaninia & Gharajedaghi 2013, Khaghaninia et al. 2014). Faunistic study on this genus has not been carried down in Shabestar region so far, therefore this study was conducted in this.

Materials and Methods

Materials were collected by sweeping the poaceous plants’ heads using entomological net from Shabestar region in East Azerbaijan province- Iran during 2013- 2014. Shabestar region is located in the northern east of East Azerbaijan province with X from 45°5′ to 46°9′ E, Y from 37°5′ to 38°24′ N, and varying in altitude from 1275 m to 3195 m a.s.l. The collected specimens were killed in a potassium cyanide jar. In order to dissection of the male genitalia, the postabdomen was removed and soaked in boiling 10% KOH solution for about 10 minutes. The specimens were kept in 75% ethanol in glass vials. These Collected specimens were stored in both the Insect Collection of Professor Hasan Maleki Milani, Tabriz, Iran (ICHMM) and Czech University of Life Sciences collections (CULS). The species were identified according to Nartshuk et al. (1988), Nartshuk & Fedoseeva (2011a), and Nartshuk & Andersson (2013). The distributions of the studied species mostly were provided from Nartshuk & Fedoseeva, (2011b) and Nartshuk & Andersson (2013).

Results

In this study, eight species of the genus Meromyza from the Shabestar region were collected and identified which among them, M. filippovi Ozerov, 2009 and M. ornata (Wiedemann, 1817) as well as M. cariniventris Zetterstedt, 1848; M. facialis Fedoseeva, 1962 and M. plurisetata Peterfi, 1961 are newly reported from Iran and the East Azerbaijanian province, respectively.

Key to the studied species of the genus Meromyza Meigen, 1830 (With same modification from Nartshuk et al. 1988, Nartshuk & Fedoseeva 2011a, Nartshuk & Andersson 2013)

1. Abdomen black dorsally (Fig. 16). Ocellar triangle with a large black semisquare spot (Fig. 15). Postgonite as in Fig. 17, Spring form of M. nigritentris Macquart, 1835
   - Abdomen pale with or without 1 or 3 black or brown longitudinal stripes, ......................................................... 2
2. The last tarsal segment distinctly black (Fig. 7). Postgonite as in Fig. 9, M. filippovi Ozerov, 2008
   - All tarsal segments pale or slightly darkened ................. 3
3. Palpi pale, occasionally weakly darkened only apically ... 4
   - Palpi black in apical halves, ........................................ 5
4. Male genitalia (Fig. 21, 22): Epandrium with long setae, end of anterior process of postgonite tapered, .......................................................... M. ornata (Wiedemann, 1817)
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— Male genitalia: Epandrium with short setae, postgonite narrower at the apex (Fig. 32). M. variegata Meigen, 1830
5. Median stripe of mesonotum not passing onto scutellum (Fig. 2). Postgonite as in Fig. 1

M. curvinervis Zetterstedt, 1848
— Median stripe of mesonotum passing onto scutellum. 6
6. Lower margin of gena with a row of black setae (Fig. 23). Postgonite as in Fig. 25. M. pluriseta Péterfi, 1961
— Lower margin of gena without or with a row of yellow setae. 7
7. Stripes of mesonotum black and brown (Fig. 12). Postgonite as in Fig. 13

Summer form of M. nigriventris Macquart, 1835
— All stripes on mesonotum black. 8
8. Postgonite very large, with tip of anterior process depressed (Fig. 29). M. saltatrix (Linnaeus, 1761)
— Anterior process of postgonite black, with slightly concave lower margin (Fig. 6)

The List of studied Meromyza Meigen, 1830 species
Meromyza curvinervis Zetterstedt, 1848 (Fig. 1-3)
Material examined: East Azarbaijan province: Shabestar (Shanejan), 38°13′39.3″ N, 45°43′07.6″ E, 1602 m, 1♂, 28 Jul. 2014; leg. R. Namaki Khamneh.

Host: *Ammophila arenaria* and *Corynephorus canescens* (Poaceae) (Nartshuk & Andersson 2013).

Distribution: This species is commonly distributed in palaearctic region including Kazakhstan, Central Asia, Afghanistan, East Siberia and the steppes of Mongolia, Iran.

Meromyza facialis Fedoseeva, 1962 (Fig. 4-5)
Material examined: East Azarbaijan province: Shabestar (Shanejan), 38°11′30.0″ N, 45°30′05.7″ E, 1320 m, 2♂♂, 10 Jun. 2014; leg. R. Namaki Khamneh.

Host: Unknown

Distribution: This species is identified from the north Caucasus (Ciscaucasia) and Iran (Rajabi et al. 1997).

Meromyza filippovi Ozerov, 2009 (Fig. 7-9)
Material examined: East Azarbaijan province: Heris, 38°15′04.2″ N, 45°31′02.3″ E, 1595 m, 3♂♂, 15 Jun. 2014; leg. R. Namaki Khamneh.

Diagnostic characters: Stripes on mesonotum brownish, median stripe ends before scutellum; abdomen without any stripe; ocellar triangle yellow without black lateral margins; only ultimate tarsal segment black; palpi entirely yellow; lower margin of gena without setae; body length 4 mm.

Host: Unknown

Distribution: This species is identified from the European part of Turkey. First record from Iran.

Meromyza nigriventris Macquart, 1835 (Figs. 10-17)
Material examined: East Azarbaijan province: Heris, 38°15′04.2″ N, 45°31′02.3″ E, 1595 m, 90♂♂, 81♀♀, 15 Jul. 2014; (Haftcheshmeh), 38°12′24.1″ N, 45°27′29.8″ E, 1313 m, 75♂♂, 80♀♀, 19 Jun. 2013; (Khamneh), 38°11′26.2″ N, 45°38′08.9″ E, 1501 m, 103♂♂ 96♀♀, 12 Jul. 2014; (Kuzekonan), 38°11′07.6″ N, 45°33′41.8″ E, 1383 m, 119♂♂, 103♀♀, 7 Jun. 2014; (Shanejan), 38°13′39.3″ N, 45°43′07.6″ E, 1595 m, 351♂♂, 358♀♀, 4 Jun. 2014; (Sharafkhaneh), 38°11′30.0″ N, 45°30′05.7″ E, 1320 m, 131♂♂, 120♀♀, 3 May. 2014; (Til), 38°15′31.7″ N, 45°28′50.8″ E, 1489 m, 83♂♂, 101♀♀, 4 Jul. 2014; leg. R. Namaki Khamneh.

Comment: The spring and summer forms are found from fields near the Orumieh Lake with about 1300 m latitude and mostly from Mishov mountainside with about 1700 m altitude, respectively.

Host: Larvae develop in different cereals: wheat, barley, rye and many wild grasses: *Aegelops* sp., *Elytrigia repens*, *E. tenerrum*, *Agropyron cristatum*, *Lolium perenne*, *Arrhanatherum elatius*, *Phleum pratense*, *Hierochloe odorata* and *Calamagrostis*
epigeios. Therefore, this species is a pest of cereals (Nartshuk & Andersson 2013).

**Distribution:** This species has Holarctic distribution; in the Palaearctic Region, from Western Europe to China and Japan, also in Iran (Khaghaninia et al. 2014).

*M. ornata* (Wiedemann, 1817) (Fig. 18-22)

**Material examined:** East Azarbaijan province: Shabestar (Khamneh), 38°11’26.2” N, 45°38’08.9” E, 1501 m, 2♂♀4♀♀, 12 Jul. 2014; leg. R. Namaki Khamneh.

**Diagnostic characters:** Background color greenish; body elongated; ocellar triangle longer than wide basally, surface of ocellar triangle wrinkled, ocellar triangle yellow; occiput black; head setae predominantly black; palpi greenish; stripes of mesonotum black, but the middle stripe brownish in anterior part, median stripe passing through scutellum; abdomen with 2 spots on posterior margin of 1st tergite, other tergites with 1 spot at the middle; hind femora 2.5 times as thick as tibiae; epandrium covered with long pale setae; body length 4.0–4.5 mm.

**Host:** Larvae live in shoots of *Deschampsia caespitosa*. The first instar hibernate and in spring move into another plant to continue development (Nartshuk & Fedoseeva 2011b).

**Distribution:** This species is distributed in Palaearctic Region from Europe to the Russian Far East. **The First**
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Meromyza pluriseta Péterfi, 1961 (Fig. 23-25)

Material examined: East Azarbaijan province: Shabestar (Til), 38°15’31.7” N, 45°28’50.8” E, 1489 m, 1♂, 4 Jul. 2014; leg. R. Namaki Khamneh.

Host: Larvae feed and develop in shoots of Hierochloe odorata, Elytrigia repens and perhaps on other grasses (Nartshuk & Andersson 2013).

Distribution: This species is distributed in Palaearctic Region including Kazakhstan, Central Asia, Afghanistan, East Siberia and Mongolia and Iran.

Meromyza variegata Meigen, 1830 (Fig. 30-32)

Material examined: East Azarbaijan province: Shabestar (Heris), 38°15’04.2” N, 45°31’02.3” E, 1595 m, 3♂, 1♀, 15 Jul. 2014; (Shanejan), 38°13’39.3” N, 45°43’07.6” E, 1602 m, 9♂, 4♀, 4 Jun. 2014; (Til), 38°15’31.7” N, 45°28’50.8” E, 1489 m, 10♂, 8♀, 4 Jul. 2014; leg. R. Namaki Khamneh.

Host: This species feed on Phleum phleoides and also can feed on cultivated cereals. (Nartshuk & Andersson 2013, Safonkin et al. 2013).

Distribution: This species is distributed in Europe, Afghanistan and Iran (Khaghaninia & Gharajedaghi 2013).

Discussion

Shabestar region with special situation, between Urmiyeh salty lake in the south and the Mishov mountain in the north, has diverse environments with very rich flora and subsequently insect fauna like frit flies. Species of the genus Meromyza are found in forest, open habitats such as grasslands, steppe and less frequently, in floodland meadows, on pastures, on roadsides and in fields (Nartshuk & Fedoseeva 2011b). The results show the species M. nigriventris has a large frequency among the other species which followed by M. saltatrix. The species M. nigriventris, one of the most important pests of cereals is collected more significantly from
the wheat and barley fields than grasslands, evidently this species prefer the cereals as host more than the grasslands (Nartshuk & Andersson 2013). As the species of this genus could be serious pests of the cereal thus in order to know the fauna of this genus in the other parts of Iran, further studies are necessary.

References