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New Records of Iranian Grass Gall Midges (Diptera: Cecidomyiidae)

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ABSTRACT

The diversity of plant species belonging to the Poaceae family in Iran is very rich with about 500 known species. Many species of gall midges (Diptera: Cecidomyiidae) have a feeding relationship with plants of the Poaceae family. Despite the great species richness of Poaceae in Iran and the association between Cecidomyiidae/Poaceae, only 6 species of gall midges have been collected and identified from the plants of the Poaceae in Iran. In the present investigation related to the gall midge fauna of Iran, 3 genera namely, *Calamomyia* Gagné, 1969, *Epicalamus* Sylvén, 1998 and *Mayetiola* Kieffer, 1896 and 13 species namely, *C. echinochloa* Felt, 1916, *Contarinia festucae* Jones, 1940, *C. floricola* (Oettingen, 1927), *C. lolii* Metcalfe, 1933, *Dasineura alopecuri* (Reuter, 1895), *E. phalaridis* Sylvén, 1998, *Lasioptera arundinis* Schiner, 1854, *L. calamagrostidis* Rübsaamen, 1893, *L. donacis* Coutin, 2001, *Mayetiola poae* (Bosc, 1817), *Stenodiplosis sorghicola* (Coquillett, 1899), *S. geniculati* (Reuter, 1895) and *S. panici* Plotnikov 1926 are reported for the first time from the country. The adult specimens were obtained by rearing from their larvae on 13 genera and 13 species of Poaceae. The genus *Calamomyia* Gagné 1969, which is distributed in the Nearctic region, is reported for the first time from the Palearctic region.

Keywords: fauna, Cecidomyiinae, Poaceae, host plant, Iran.

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INTRODUCTION

Midges of the family Cecidomyiidae (Diptera, Nematocera) presently includes 6651 known species and 832 genera with a worldwide distribution. They form 6 subfamilies, including Catotrichinae, Lestremiinae, Micromyinae, Winnertziinae, Porricondylinae and Cecidomyiinae (Gagné & Jaschhof, 2021). Excluding the Cecidomyiinae, which are primarily herbivores with a number of aphidophagous species, the other subfamilies comprise about one-fourth of the known species, and are all fungivores. Many Cecidomyiidae induce galls and therefore are commonly known as gall midges. Many species of this subfamily have economic importance as pests of cultivated plants or biological control agents of weeds and as predator of harmful insects such as aphids (Gagné & Jaschhof, 2021; Kolesik & Gagné, 2020).

The plant species belonging to Poaceae Barnhart (Poales) is the second most important family in terms of the number of genera with about 130 genera and the third most important family in Iran in terms of the number of species with about 500 species (Ghahremaninejad & Nejad Falatoury, 2016).

In the catalogue provided by Gagné & Jaschhof (2021), about 144 species of gall midge species of the world are associated with Poaceae. About 55% of them are from the genus *Mayetiola* Kieffer, 1896, *Orseolia* Kieffer & Massalongo, 1902, and *Contarinia* Rondani, 1860, families.

Some of them are among the most important pests of crops such as wheat: the orange wheat blossom midge, *Sitodiplosis mosellana* (Géhin, 1857), the yellow wheat blossom midge, *Contarinia tritici* (Kirby, 1798) and the saddle gall midge, *Haplodiplosis marginata* (Roser, 1840) (Chavalle, Buhl, San Martin y Gomez, & De Proft, 2018). and rice: *Orseolia oryzae* (Wood-Mason, 1889) (Jagadeeshakumar, Chakravarthy, Doddabasappa, & Basavara, 2009).

Despite the great species richness of Poaceae family in Iran, the collection and identification of gall midges associated with Poaceae are rare. To date, only six genera and six species have been identified from Iran. The aim of this study is to search and identify more species of gall midges' fauna associated with Poaceae in Iran/west Azerbaijan province.

MATERIAL AND METHOD

First of all, a list of gall midge's host plants from the Poaceae family was prepared using the Gagné & Jaschhof (2021) and Skuhravá & Skuhravý (2021).

After identifying the grasses that were host plant for gall midges in the area, plant materials suspected of gall midge larvae were collected during the year 2020-2022 from ten districts of west Azerbaijan province, Iran (Fig. 1). Collected plant materials, were transported to the laboratory in plastic bags. Collection dates of plant materials were recorded. After transferring to laboratory, plant materials were kept separately according to species in glass boxes (50 × 40 × 80 cm) covered with muslin, fixed with a rubber band, until the emergence of adults. Soft sand was poured on the bottom of the box to

a height of 2 cm so that the species that pupate in the soil have a place for pupation. All boxes were checked daily for collection of emerging gall midge adults for 25-30 days. Emerged adults were put in vials with 75% ethanol and kept for identification. Some studied adult specimens were mounted on permanent microscope slides using Canada balsam as medium according to the method described by Jaschhof & Jaschhof (2009).

The specimens were identified using the keys written by Skuhravá (1997). Gagné & Jaschhof (2021) were used to obtain the known geographic distribution of each species.

All voucher specimens, both on slides and in ethanol, are deposited in the second author's collection at the Bítovská 1227/9, CZ-140 00 Praha 4, Czech Republic. The species are listed in alphabetical order by the genus.

Figure 1. *Sampled area and the distribution map of identified gall midge's species. (Google Earth, 2023) 1) *Calamomyia echinochloa* and *Stenodiplosis panici,* 2) *Contarinia lolii*, 3) *Lasioptera arundinis* and *Mayetiola poae*, 4) *Contarinia floricola, Dasineura alopecuri* and *Lasioptera donacis*, 5) *Contarinia festuca* and *Stenodiplosis sorghicola*, 6) *Epicalamus phalaridis,* 7) *Contarinia lolii*, 8) *Lasioptera donacis*, 9) *Stenodiplosis geniculati,* 10) *E. phalaridis* and *Lasioptera calamagrostidis.*

* The areas shown on the map are approximate.

RESULTS AND DISCUSSION

Keeping the plant materials under the appropriate laboratory conditions led to the gradual emergence of adult gall midges. All the examined materials of adult gall midges appeared in the rearing cages within 25 to 30 days after keeping the plant material in the laboratory. The adults belonged to seven genera and thirteen species as follow:

***Calamomyia* Gagné, 1969**

***Calamomyia echinochloa* Gagné, 1969**

Lasioptera echinochloa Felt, 1916

Distribution: USA, South Dakota, host plant: *Echinochloa crus-galli* (L.) (Poaceae).

Material examined: Khoy (vicinity of Pïrkandï village, sugar beet field), 38º 43′ 30″ N, 45º 06′ 36″ E, 1000 m asl., plant materials collection date (pmcd): 13 Aug. 2020, ♀♂

Host plant: *E. crus-galli* L.

Remark: Genus *Calamomyia* Gagné 1969 comprises 13 species. All known species of *Calamomyia* were recorded from USA (Felt, 1916). Therefore, this is the first report of genus *Calamomyia* from the Palaearctic region. With the record of *C. echinochloa* from Iran, the distribution of *Calamomyia* spreads to the Palearctic region.

***Contarinia* Rondani, 1860**

***Contarinia festucae* Jones, 1940**

Distribution: Bulgaria, Czech Republic, Germany, Poland, Slovakia, Sweden, United Kingdom; Host plant: *Festuca pratensis* Huds., *F. rubra* L. (Poaceae).

Material examined: Urmia, vicinity of Band village, 37º27′46″ N, 44º55′33″ E, 1480 m asl. margins of spruce grove, pmcd: 2 July 2020, ♀♂

Host plant: *Festuca ovina*. Yellow coloured larvae live in inflorescences of *Festuca* spp. without any external deformation.

Remark: First record from the western parts of Palearctic region.

***Contarinia floricola* (Oettingen, 1927)**

Contarinia poae Barnes 1946

Distribution: Czech Republic, Germany, Poland, Slovakia, Sweden, United Kingdom. Host plants: *Poa* sp.; *P. pratensis* L., *P. trivialis* L. (Poaceae).

Material examined: Urmia, Sero, 37º43′18″ N, 44º42′43″ E, 1531 m asl., sugar beet field margins, pmcd: 4 Aug. 2020 and 4 May 2021, ♀♂

Host plant: *Poa trivialis*. Several yellow coloured larvae live in seeds of *Poa* spp. One generation develops per year.

Remark: First record from the western parts of Palearctic region

***Contarinia lolii* Metcalfe, 1933**

Distribution: Poland, United Kingdom; host plant: *Lolium pratense*.

Material examined: Urmia, Sir Mountain, vicinity of Kelïsä Kandï village 37º29′08″ N, 45º01′31″ E, 1638 m asl., pmcd: 4 Sept. 2020, ♀♂; Urmia, Ghoshchi pass, 38°01’36’’N, 44°57’46’’E, 1638 m asl., pmcd: 7 Aug. 2020, ♀♂

Host plant: *Lolium perenne*. Several yellow-coloured larvae develop in the inflorescences of *L. perenne*.

Remark: First record from the western parts of Palaearctic region. The genus *Contarinia* has 318 species that are distributed in different regions of the world. Many of them live gregariously in the flower heads and leaf rolls of host plants. Till now three species of genus *Contarinia* have been reported from Iran, including *C. desertorum* Marikovskij, 1961 [host plant: *Alhagi maurorum* Medik. (Fabaceae)], *C. tritici* (Kirby, 1798) [host plant: *Triticum vulgare* L. (Poaceae)] and *Contarinia* sp.1 [host plant: *Echinophora orientalis* Hedge & Lamond (Apiaceae)](Karimpour & Skuhravá, 2012; Farahbakhsh, 1961). *Alhagi maurorum* Medik.

Dasineura Rondani, 1840

Dasineura alopecuri (Reuter, 1895)

Oligotrophus alopecuri Reuter, 1895: 3

Dasyneura agropyronis Barnes, 1927: 214

Distribution: Bulgaria, Czech Republic, Denmark, Finland, Germany, Poland, Sweden, United Kingdom. Immigrant to north America (Canada (Ontario, New Brunswick) and New Zealand. Host plant: *Alopecurus pratensis* L.; *Agropyron repens* (L.) (Poaceae).

Material examined: Urmia, Sero, 37º43′18″ N, 44º42′43″ E, 1531 m asl, sugar beet field margins., pmcd: 19 July 2020, ♀♂

Host plant: *Agropyron repens*. Orange to brick-red larvae live solitary in florets of *A. pratensis* and *A. repens*.

Remark: First record from the western parts of Palaearctic region. Ten species of the genus *Dasineura* Róndani, 1840 have been reported from Iran (Skuhravá Skuhravá, Karimpour, Sadeghi, Gol & Joghataei, 2014; Karimpour, Skuhravá. Lotfalizadeh & Razmi, 2022). The present species stands as eleventh.

Epicalamus Sylvén, 1998

Epicalamus phalaridis Sylvén, 1998

Distribution: Sweden, Host plant: *Phalaris arundinacea* L. (Poaceae).

Material examined: Naghadeh, near the Solduz wetland, 37°02′29″ N, 45°36′53″ E, 1280 m asl, pmcd: 28 April 2021, ♀♂; Urmia, vicinity of Shahar Chaïe dam, 37°27′38′′N, 44°54′57′′E, 1600 m asl., pmcd: 22 May 2021, ♀♂; Urmia, vicinity of Band village, pmcd: 2 July 2020, ♀♂

Host plant: *Phalaris arundinacea.* Up to 4 mm large, and orange colour larvae live gregariously within leaf sheath.

Remark: Iran is the second country where this species is reported. This genus comprises one species is known as a severe pest of *P. arundinacea* in Sweden. Larvae feed beneath the leaf sheaths and cause severe damage (Hellkvist, Finell & Landström, 2003).

Lasioptera **Meigen, 1818**

Lasioptera arundinis **Schiner, 1854**

Distribution: Widespread in Europe including, Austria, Belgium, Bulgaria, Crete, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Malta, Netherlands, Poland, Serbia, Slovakia, Switzerland and United Kingdom; Host plant: *P. australis* (Skuhravá, M. & Skuhravý, 2021).

Material examined: Urmia, Urmia University campus, 37º39′14″ N, 44º58′35″ E, 1360 m asl., pmcd: 8 May 2022, ♀♂

Host plant: *Phragmites australis* (Cav.) Trin. The whitish larvae of *L. arundinis* live gregariously in the swollen lateral shoots of common reed, *Phragmites australis* in the mutualistic relationship with the fungus *Radulidium subulatum* (de Hoog). The fungus allows the larva to penetrate into the stem and to have access to the vascular tissues. The fungus protects the larva against parasites and allows an easy exit of the imago. The adult gall midge and the first larval stage have adapted structures to carry the fungus (Rohfritsch, 1992; Arzanlou et al, 2007). The occurrence of this fungus has been reported in Iran, including around Urmia Lake (Salimi, Alizadeh, Mirzadi Gohari, & Javan-Nikkhah, 2019).

Only one generation develops per year (univoltine). Hibernation and pupation takes place in the gall.

Remark: To date, three species of gall midges namely, *Asynapta phragmitis* (Giraud, 1863), *Lasioptera flexuosa* (Winnertz, 1853) and *Giraudiella inclusa* (Frauenfeld, 1862) have already been reported from common reed in Iran, west Azerbaijan province, Urmia (Skuhravá et al, 2014; Karimpour et al, 2022). With report of *L. arundinis* in this paper the number of gall midge species that are associated with common reed in Iran (west Azerbaijan province) reaches to four species.

First record from the western parts of Palearctic region.

Lasioptera calamagrostidis **Rübsaamen, 1893**

Lasioptera graminicola (Kieffer, 1898)

Distribution: Czech Republic, Denmark, France, Germany, Hungary, Latvia, Netherlands, Poland, Slovakia, Ukraine, United Kingdom; Host plant: *Calamagrostis epigeios*, also other grasses (Poaceae).

Material examined: Naghadeh, vicinity of Solduz wetland, 37°02′29″ N, 45°36′53″ E, 1280 m asl., pmcd: 21 July 2020 and 7 Sept.2021, ♀♂

Host plant: *Calamagrostis epigeios* (L.) Roth. Larvae live under the leaf sheath of *C. epigeios*.

Remark: First record from the western parts of Palearctic region.

Lasioptera donacis **Coutin, 2001**

Lasioptera donacis Coutin & Faivre-Amiot, 1981

Distribution: Bulgaria, Egypt, France, Greece, Italy, Malta; Host plant: *Arundo donax* L.

Material examined: Urmia, Ziveh, 37º15′43″ N, 44º53′51″ E, 1470 m asl, pmcd: 27 July 2020, ♀♂; Urmia, Sero, 37º43′18″ N, 44º42′43″ E, 1531 m asl., pmcd: 4 Aug 2020, ♀♂

Host plant: *Arundo donax* L. Larval infestation of *A. donax* stems by *L. donacis* is always associated with the presence of a saprophytic fungus, *Arthrinium arundinis* Corda (Xylariales: Apiosporaceae), which is believed to provide a trophic resource for the larvae in the reed leaf (Goolsby et al, 2013; Thomas & Goolsby, 2015; Bon et al, 2018).

The larvae live in the corridors created by a stem-mining agromyzid fly, *Cerodontha* sp. (Diptera) inside the stems and feed on the mycelium of the fungi *Arthrinium arundinis* (Corda) (Coutin & Faivre-Amiot, 1981).

Remark: First Asian record of the species. Till now, three species of *Lasioptera* namely, *L. carophila* Löw, 1874, *L. umbelliferarum* Kieffer, 1909 and *L. flexuosa* (Winnertz, 1853) were reported from Iran (Skuhravá et al, 2014). With this report, their number goes to four species.

Mayetiola Kieffer, 1896

Mayetiola poae (Bosc, 1817)

Mayetiola graminis (Fourcroy, 1785)

Cecidomyia graminis (Brischke, 1869)

Distribution: Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Hungary, Italy, Latvia, Lithuania, Luxemburg, Netherlands, Poland, Romania, Switzerland, United Kingdom, Yugoslavia; Host plant: *Poa nemoralis* L.

Material examined: Urmia University Campus, 37º39′14″ N, 44º58′35″ E, 1360 m asl., pmcd: 4 May 2021, ♀♂

Host plant: *Poa bulbosa* L. White larvae of *M. poa* cause malformations on the stems of *P. nemoralis*. The species has one generation per year. Hibernation occurs as fully developed larvae in the brown puparium in the gall and they pupate in the gall in spring.

Remark: This is the first Iranian record of genus *Mayetiola* and Asian record of the species.

Stenodiplosis Reuter, 1895

Stenodiplosis sorghicola (Coquillett, 1899)

Contarinia sorghicola Coquillett, 1899

Contarinia andropoginis Felt, 1921

Contarinia saltata Felt, 1919

Contarinia palposa Blanchard, 1958

Contarinia andropogonis Harris, 1964

Distribution: *Stenodiplosis sorghicola* occurs in Africa, India (Tamil Nadu), southeastern China, Japan (Honshu, Kyushu) and the Philippine (Luzon). It is non-native in southern USA, Mexico, Dominican Republic and Argentina. Although *S. sorghicola* originated in Africa, it has recently spread in various countries of the world wherever sorghum is grown. Albania, Greece, Italy and southern France are countries in Europe where this species is found (Skuhrava & Skuharvy, 2021).

Material examined: Urmia, vicinity of Band village, 37º27′46″ N, 44º55′33″ E, 1480 m asl., pmcd: 7 Aug 2020, ♀♂

Host plant: *Sorghum halepense* (L.) Pers. The larvae of *S. sorghicola* feed on the newly formed ovaries of growing sorghum seeds inside the inflorescences which leads to ear sterility. It is agricultural pest on *Sorghum bicolor* and reproduce several generations per year (multivoltine).

***Stenodiplosis geniculati* (Reuter, 1895)**

Distribution: Bulgaria, UK, Sweden, Finland, Poland; immigr.: Canada (Ontario, New Brunswick), New Zealand USA (South Dakota), New Zealand. *Alopecurus geniculatus*; *A. arundinaceus*, *A. pratensis* (Poaceae).

Material examined: Urmia, Mahabad road, vicinity of Arablü village, 37°24’40’’N, 45°14’53’’E, 1278 m asl., ten-year-old vineyard, pmcd: 16 July 2021, ♀♂

Host plant: *Alopecurus myosuroides* Huds.

***Stenodilosis panici* (Plotnikov, 1926)**

Distribution: Yugoslavia, Ukraine, Russia (Europe), Kazakhstan, Uzbekistan, China (widespread). *Panicum miliaceum*, *E. crus-galli* (Poaceae).

Material examined: Khoy, vicinity of Pïrkandï village, sugar beet field., 38º 43′ 30″ N, 45º 06′ 36″ E, 1000 m asl., pmcd: 18 Aug., 2020, ♀♂

Host plant: *Echinochloa crus-galli* (L.). Orange colored larvae live gregariously in the flowers of host plants.

Remark: Genus *Stenodiplosis* comprises 14 species with a worldwide distribution. All of which live in the inflorescences of Poaceae family (Gagné & Jaschhof, 2021). Previously, the species *S. bromicola* (Marikovskii & Agafonova, 1961) has been reported from Iran by rearing on inflorescences of *Setaria glauca* (L.) (Poaceae) (Karimpour et al, 2022). With the introduction of these three species, the number of species of this genus in Iran increases to four species.

CONCLUSION

Despite the high species richness of Poaceae in Iran and its western neighboring countries, the study of gall midges in these regions is scanty. Of which, only six genera and six species namely, *Contarinia tritici* (Kirby, 1798), host plant: *Triticum*

vulgare L., (Farahbakhsh, 1961); *Asynapta phragmitis* (Giraud, 1863), host plant: *Pharagmites australis* L. (Skuhravá et al, 2014); *Giraudiella inclusa* (Frauenfeld, 1862), *Lasioptera flexuosa* (Winnertz, 1853), host plant: *P. australis* and *Stenodiplosis bromicola* (Marikovskii & Agafonova, 1961), host plant: *Setaria glauca* (L.) (Karimpour, Skuhravá, Lotfalizadeh & Razmi, 2022) and *Orseolia cynodontis* Kieffer & Massalongo, 1902, host plant: *Cynodon dactylon* (L.) Persoon (Karimpour & Skuhravá, 2022) were reported from Iran.

In this study, 13 species of gall midges associated with the Poaceae family were collected and identified. With the identification of *C. echinochloa* from Iran, its geographical distribution areas was expanded from the Nearctic region to the Palaearctic biogeographical region. Also, 10 species gall midges were reported for the first time from Asia (west of the Palaearctic region), which indicates the presence and distribution of the above species in this geographical region.

Including 3 genera and 13 species found in this survey, the number of gall midge genera and species related to Poaceae in Iran increases to 9 and 19, respectively. Furthermore, by introducing these genus and species, the number of known gall midge fauna of Iran reaches to 41 genera and 80 species

The gall midge's fauna of Türkiye and Armenia are relatively well studied (Skuhravá, Bayram, Cam, Tezcan, & Can, 2005; Mirumian, 2011; Mirumian & Skuhravá, 2022). In Turkish gall midge fauna two species namely, *Mayetiola destructor* (Say, 1817) and *Mayetiola hordei* Kieffer, 1909 were mentioned. In the fauna of Armenia, *Mayetiola destructor* (Say, 1817) and *Contarinia tritici* (Kirby, 1798), host plant: *Triticum vulgare* Vill. have been reported by Mirumian, (2011). In Iraqi fauna, one species namely, *G. inclusa* and in the Azerbaijan fauna, no species is mentioned (Gagné & Jaschhof, 2021).

Examining the results of published research shows that grass-feeding gall midge fauna is relatively unexplored in Iran, like it is in other areas such as Türkiye, Iraq and Armenia. The results of current study revealed that more surveys are required to document the gall midge communities. Certainly, many genera and species of gall midges have remained unknown due to lack of investigation in these areas.

REFERENCES

Arzanlou, M., Groenewald, J.Z., Gams, W., Braun, U., Shin, H.-D., & Crous, P.W. (2007). Phylogenetic and morphotaxonomic revision of *Ramichloridium* and allied genera. *Studies in Mycology*, 58, 57-93. https://doi.org/10.3114/sim.2007.58.03

Bon, M.-C., Guermache, F., de Simone, D., Cristofaro, M., Vacek, A., & Goolsby, J. (2018) Insights into the Microbes and Nematodes Hosted by Pupae of the Arundo Leaf Miner, *Lasioptera donacis* (Diptera: Cecidomyiidae), *Florida Entomologist*, 101,505-507. https://doi.org/10.1653/024.101.0309

Chavalle, S., Buhl, P.N., San Martin y Gomez, G., & De Proft, M. (2018). Parasitism rates and parasitoid complexes of the wheat midges, *Sitodiplosis mosellana*, *Contarinia tritici* and *Haplodiplosis marginata*. *BioControl,* 63, 641-653. https://doi.org/10.1007/s10526-018-9899-z

Coutin, R. & Faivre-Amiot, A. (1981). Ecological interactions of saprophytic fungi and the insect *Lasioptera donacis* on *Arundo donax*). Congrès National des Sociétés Savantes Perpignan Sc. II: 195−201.

Farahbakhsh, G. (1961). *Checklist of Important Insects and Other Enemies of Plants and Agricultural Products in Iran*. Tehran: Ministry of Agriculture & Plant Protection Institute, 153 pp.

Felt, E.P. (1916). New western gall midges. *Journal of the New York Entomological Society,* 24,175-196.

Gagné, R.J. (1969). A tribal and generic revision of the Nearctic Lasiopteridi (Diptera: Cecidomyiidae). *Annals of the Entomological Society of America*, 62,1348-1364.

Gagné, R.J. & Jaschhof, M. (2021). *A Catalog of the Cecidomyiidae (Diptera) of the World*. 5th Edition. Systematic Entomology Laboratory, Agricultural Research Service, U.S. Department of Agriculture U.S. National Museum NHB, Washington, D.C., USA. 813 pp.

Ghahremaninejad, F. & Nejad Falatoury, A. (2016). An update on the flora of Iran: Iranian angiosperm orders and families in accordance with APG IV. *Nova Biologica Reperta*, 3(1),80-106. http://dx.doi.org/10.21859/acadpub.nbr.3.1.80

Google Earth 7.3. (2023) Urmia. Available at: https://earth.google.com/web/search/urmia/@37.76996269,45.36952057,1199.43419934a,477599.68022011d,35y,0h,0t,0r/data=CigiJgokCQtXCqjDZzRAEQlXCqjDZzTAGTYaVknZ6EJAIZ5wFGEuDFDAOgMKATA [Accessed 31 November 2023]

Goolsby, J.A., Racelis, A.E., Goolsby, J.B., Kirk, A.A., Cristofaro, M., Grusak, M.A., & de Leon, A.P. (2013). Evaluation of biogeographical factors in the native range to improve the success of biological control agents in the introduced range. *Biocontrol Science and Technology*, 23,1213-1230. https://doi.org/10.1080/09583157.2013.822848

Hellkvist, S., Finell, M., & Landström, S. (2003). Reed canary grass - Observations of effects on crop stand and fiber quality caused by infestation of *Epicalamus phalaridis*. *Agriculture and Food Science in Finland*, 12,49-56.

Jagadeeshakumar, B.D., Chakravarthy, A. K., Doddabasappa, B., & Basavara, B.S. (2009). Biology of the rice gall midge, *Orseolia oryzae* (Wood-Mason) in southern Karnataka. *Journal of Agricultural Science*, 22(3-Spl. Issue), (535-537).

Jaschhof, M. & Jaschhof, C. (2009). The wood midges (Diptera: Cecidomyiidae) of Fennoscandia and Denmark. *Studia dipterologica Supplement*, 18, 1-333.

Karimpour, Y. & Skuhravá, M. (2012). First record of three species of gall midges (Dip.: Cecidomyiidae) from Iran. *Journal of Entomological Society of Iran*, 32(1), 137-140.

Karimpour, Y. & Skuhravá, M. (2022). Additions to the fauna of gall midges (Diptera, Cecidomyiidae) in Iran. *Journal of Insect Biodiversity and Systematics*, 08 (4), 571-579. https://doi.org/10.52547/jibs.8.4.571

Karimpour, Y., Skuhrava, M., Lotfalizadeh, H., & Razmi, M. (2022). New Records of Gall Midges (Diptera: Cecidomyiidae) from Iran. *Journal of the Entomological Research Society*. 24(3), 321-329. https://doi.org/10.51963/jers.v24i3.2254

Kolesik, P. & Gagné, R. J. (2020) A review of the gall midges (Diptera: Cecidomyiidae) of Indonesia: taxonomy, biology and adult key to genera. *Zootaxa*, 4847 (1): 001-082. https://doi.org/10.11646/zootaxa.4847.1

Mirumian, L. (2011). Phytophagous gall midges (Diptera: Cecidomyiidae) of Armenia. *Acta Societatis Zoologicae Bohemicae*, 75, 87-106.

Mirumian, L. & Skuhravá, M. (2022). The gall midges (Diptera: Cecidomyiidae) of Armenia. 2. New records of occurrence. *Acta Societatis Zoologicae Bohemicae*, 85, 23-34.

Rohfritsch, O. (1992). A fungus associated gall midge, *Lasioptera arundinis* (Schiner), on *Phragmites australis* (Cav.) Trin., *Bulletin de la Société Botanique de France. Lettres Botaniques*, 139(1), 45-59. https://doi.org/10.1080/01811797.1992.10824942

Salimi, F., Alizadeh, A., Mirzadi Gohari, A., & Javan-Nikkhah, M. (2019). Endophytic fungus, *Radulidium subulatum* from *Phragmites australis* in Iran. *Mycologia Iranica*, 6(1),41-47. http://dx.doi.org/10.22043/MI.2020.120790

Skuhravá, M. (1997). Family Cecidomyiidae. In L. Papp & B. Darvas (Eds.) *Contributions to a Manual of Palaearctic Diptera* (*with Special Reference to Flies of Economic Importance*). (pp. 71-204.) Vol. 2. Nematocera and Lower Brachycera. Budapest: Science Herald.

Skuhravá, M., Bayram, S., Cam, H., Tezcan, S., & Can, P. (2005). Gall midges (Diptera: Cecidomyiidae) of Turkey. *Türkiye Entomoloji Dergisi*, 29 (1),17-34.

Skuhravá, M., Karimpour, Y., Sadeghi, H., Gol, A., & Joghataei, M. (2014). Gall midges (Diptera: Cecydomyiidae) of Iran: Annotated list and Zoogeographical Analysis. *Acta Societatis Zoologicae Bohemicae*, 78, 269-301.

Skuhravá, M. & Skuhravý, V. (2021). *The gall midges of Europe*. Published by KNNV, 456 pp.

Thomas, D.B. & Goolsby, J.A. (2015). Morphology of the preimaginal stages of *Lasioptera donacis* Coutin (Diptera: Cecidomyiidae), a candidate biocontrol agent for giant Arundo Cane. *Psyche*. 2015:262678..