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# On the fauna of marsh flies (Diptera: Sciomyzidae) in northwestern of Iran with first record of the genus *Limnia* Robineau-Desvoidy, 1830 for the country

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**ABSTRACT.** We studied the fauna of marsh flies (Diptera: Sciomyzidae) in northwest of Iran between 2012 and 2015. A total of eight sciomyzid species have been identified, of which *Limnia unguicornis* (Scopoli, 1763) is recorded for the first time from Iran. Notes on the biology and diagnostic characters of *L. unguicornis* are presented.

**Key words:** *Limnia*, New record, Northern west of Iran, Sciomyzidae.

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## Introduction

Flies of the family Sciomyzidae, commonly known as snail-killing or marsh flies, with 550 described species in 63 genera has worldwide distribution (Knutson and Vala 2011; Vala *et al*. 2012). This family is divided into three subfamilies: Huttoninae (2 genera), Salticellinae (1 genus Salticella) and Sciomyzinae (57 genera). Sciomyzinae is comprised of two tribes; the Sciomyzini (12 genera) and the Tetanocerini (45 genera). Larva have various habitats, as all of the Sciomyzini and Salticellinae have terrestrial larvae, whilst in 14 genera of Tetanocerinae larvae are aquatic (Wagner *et al*. 2008; Chapman 2008; Tothova *et al*. 2013). Genus *Limnia* has 17 known species in Nearctic and 5 species in Palaearctic regions (Rozkošný 1984; Chapman 2008). Rozkošný (1984) stated that the species of the genus Limnia can be malacophagous as young larvae of *L. unguicornis* have been found feeding on dead snail tissues and mature larvae act as predators of Succinea.

This genus can be easily distinguished from other close genera of the family Sciomyzidae by the combination of the following characters: Two pairs of orbital setae; arista with short and whitish hairs; mesopleuron and pteropleuron with hairs only, prosternum haired or at least with 1

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hair on each side, mesonotum with longitudinal stripes; scutellum with 2 pairs of setae; subalar setae present; wing with distinct reticular pattern.

Prior to this study 19 species were known from Iran (Tirgari and Massoud 1979; Ayatollahi 1971; Knutson *et al*. 1973; Tirgari and Fathpoor 1974; Yano 1978; Tirgari and Massoud 1979; Tirgari and Massoud 1981; Vala and Leclercq 1981; Rozkošný 1987; Motamedi *et al*. 2006; Mohammadzade Namin *et al.* 2015; Seddighi Sadr and Mohammadzade Namin 2016).

## Material and methods

Specimens were collected by standard sweep-netting in various habitats (forest, grassland and semi-aquatic areas) in the northwest of Iran during 2012-2015. The species have been identified using (Rozkošný 1984; Vala 1989). The voucher specimens are deposited at the Collection of Dr. H. Maleki Milani, University of Tabriz, Iran (ICHMM).

## Results

Totally 8 species have been collected and identified, among them *Limnia unguicornis* (Scopoli, 1763) is a new record for Iran.

### Subfamily Sciomyzinae
### Tribe Sciomyzini

**1. *Pherbellia cinerella* (Fallén, 1820)**

**Material examined:** 3♀♀, 1♂, East Azerbaijan Province, Kandovan, 37°46′N, 46°16′E, 2500 m a.s.l., 15.VII.2012 (moist grassland habitat), Leg. S. Khaghaninia.

**Distribution:** Palaearctic: From Ireland and Fennoscandia to the round Mediterranean area; North Africa, eastern Russia; Armenia, Tadjikistan, and Afghanistan. Oriental region (Rozkošný and Elberg 1984; Vala 1989). Previously cited in Iran by Rozkošný and Elberg (1984).

### Tribe Tetanocerini

**2. *Coremacera catenata* (Loew, 1847)**

**Material examined:** 2♂♂, East Azerbaijan Province, Qaradagh, 38°51′N, 46°52′E, 1770 m a.s.l., 14.VI.2012 (forest habitat); 2♂♂, 1♀; Horand, 38°59´N, 47°22´E, 1370 m a.s.l., 14.VII.2013 (grassland habitat); 1♂, Qurigol, 37°54.975 N, 46°41',120 E, 1943 m a.s.l., 9.VII.2012 (lagoon habitat), Leg. S. Khaghaninia.

**Distribution:** Palaearctic: From Germania to Poland. Sub-Mediterranean: France, Italy; Balkan region; Turkey; Israel, Syria. Transcaucasia, Iraq (Rozkošný and Elberg 1984; Vala 1989). Previously cited in Iran by Rozkošný (1987).

**3. *Coremacera marginata* (Fabricius, 1775)**

**Material examined:** 5♀♀, East Azerbaijan Province, Chichakli, 38°39′N, 46°31′E, 2140 m a.s.l., 5.VIII.2013 (grassland habitat); 3♂♂, 2♀♀, Qaradagh, 38°51′N, 46°52′E, 1770 m a.s.l., 14 June 2014 (forest habitat); 1♂, Horand, 38°59´N, 47°22´E, 1370 m a.s.l., 14.VI.2012 (grassland habitat); 3♂♂, 1♀, Qurigol, 37°54′N 46°42′E, 1920 m a.s.l., 8.VI.2012 (lagoon habitat), Leg. S. Khaghaninia.

**Distribution**: Palaearctic: from Ireland to Spain, France, Turkey, and European parts of Russia; Georgia; Armenia, Azerbaidjan (Rozkošný and Elberg 1984; Vala 1989), Iran (Rozkošný 1987).

**4. *Hydromya dorsalis* (Fabricius, 1775)**

**Material examined:** 2♀♀, East Azerbaijan Province, Kandovan, 37°45 N, 46°18′E, 2840 m a.s.l., 20.V.2012 (moist grassland habitat); 3♂♂, 4♀♀, Qaradagh, 38°51′N, 46°52′E, 1770 m a.s.l., 14.VI.2013, (forest habitat), Leg. S. Khaghaninia.

**Distribution**: Palaearctic: Europe: widely distributed from Scandinavia to Spain and the British Isles to Siberia. Reported in North Africa. Middle east, Afghanistan,

Mongolia and further east in the Kuril Islands and Japan (Rozkošný and Elberg 1984; Vala 1989), Iran (Rozkošný and Elberg 1984).

**5. *Limnia unguicornis* (Scopoli, 1763)**

**Material examined:** 3♂♂, 2♀♀, East Azerbaijan Province, Qaradagh, 38°51′N, 46°52′E, 1770 m a.s.l., 14.VI.2012, (forest habitat); 1♂, 1♀, Jolfa, 38°48 N, 45°43′E, 1360 m a.s.l., 20.VI.2013 (grassland habitat); 1♂, 3♀♀, Qurigol, 37°54.975 N, 46°41',120 E, 1943 m a.s.l., 9.VI.2012 (lagoon habitat), Leg. S. Khaghaninia.

**Distribution:** Eurasian (Rozkošný and Elberg 1984; Vala 1989), **New record for Iran**.

**Diagnostic characters:** Antenna yellow, arista with short and whitish hairs (Fig. 2); wing pattern like in (Fig. 1); median strip on mesonotum yellow bordered by a narrow black strips on each side (Fig. 3); anterior process of hypanderium finger like, surstylus triangular, inner side of surstylus erected (Fig. 4).

**6. *Sepedon sphegea* (Fabricius, 1775)**

**Material examined:** 3♂♂, East Azerbaijan Province, Chichakli, 38°39′N, 46°31′E, 2140 m a.s.l., 12.VII.2015 (forest habitat), Leg. S. Khaghaninia.

**Distribution:** All Palearctic Region, until Japan (Rozkošný and Elberg 1984; Vala 1989), Iran (Knutson *et al*. 1973).

**7. *Sepedon spinipes* (Scopoli, 1763)**

**Material examined:** 2♂♂, East Azerbaijan Province, Chichakli, 38°39′N, 46°31′E, 2140 m a.s.l. 15.VII.2015, (forest habitat), Leg. S. Khaghaninia.

**Distribution.** Widely distributed in the Palaearctic Region, North Africa, Mediterranean islands, Turkey, Siberia, Armenia (Rozkošný and Elberg 1984; Vala 1989), Iran (Knutson *et al*. 1973).

**Subfamily: Salticellinae**

**8. *Salticella fasciata* Meigen, 1830**

**Material examined:** 2♂♂, East Azerbaijan Province, Chichakli, 38°39′N, 46°31′E, 2140 m a.s.l., 20.VII.2015, (forest habitat), Leg. S. Khaghaninia.

**Distribution:** Widely distribution in the western Palaearctic, southern and central Europe, from Ireland in the west to Iran in the east, and from the Netherlands in the north to Northern Africa in the south (Rozkošný and Elberg 1984; Vala 1989).

**Discussion**

In this study *Limnia unguicornis* is collected from various habitats that indicated, this species can have a wide host range and it is active mostly between Jun-July in northern west of Iran that may be related to low temperature in other months in this region. Vala and Knutson (1990) described the egg, the three larval stages and the puparium of *L. unguicornis*. They explained] life cycle and emphasized on the long pre-oviposition period, about 100 days; the puparium formed outside of the prey is the overwinter stage. The success laboratory rearing were only with the terrestrial *Lauria cylindracea* and the hygrophilous *Succinea elegans*. In addition, neonate slugs [*Deroceras reticulatum*] allowed a complete larval development. The species is univoltine.

This is second observation of *S. fasciata* in Iran. Mortelmans (2015) stated that adult of *S. fasciata* feed primarily on Moribund snails and almost all western European records of *S. fasciata* are from coastal locations. In southern France adults of *S. fasciata* are active from September to June (Coupland *et al*. 1994). In this study, we collected this species from Arasbaran forests in May, so these results show that this species is also active in forests.


**Figure 1-4:** *Limnia unguicornis* (Scopoli, 1763); **1.** Male habitus (lateral view, **2.** Head and antenna (lateral view), **3.** Mesonotum (upper view); **4.** Epandrium and surstylus (caudal view).

These results show that fauna of marsh flies is rich in northern west of Iran, So further studies are needed in order to clarifying host range and distribution of the species in northern west and other parts of country.

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## References

Ayatollahi, M. 1971. Importance of the study of Diptera and their role in biological control. *Journal of Applied Entomology and Phytopathology*, 31: 20–28. (in Persian).

Chapman, E. 2008. Bayesian Phylogenetics of Snail-Killing Flies (Diptera: Sciomyzidae) and Freshwater Mussels (Bivalvia: Unionidae): Implications of Parallel Evolution, Feeding Group Structure and Molecular Evolution. PhD Dissertation, Kent State University, Ohio, United States, 202 pp.

Coupland J.B., Espiauand, A. and Baker, G. 1994. Seasonality, longevity, host choice, and infection efficiency of *Salticella fasciata* (Diptera: Sciomyzidae), a candidate for the biological control of pest helicid snails. *Biological Control*, 4: 32–37.

Knutson, L.V., Shagudianand, E.R. and Sahba, G. H. 1973. Notes on the biology of certain snail-killing flies (Sciomyzidae) from Khuzestan (Iran). *Iranian Journal of Public Health*, 2(3): 145–155.

Knutson, L.V. and Vala, J.C. 2011. *Biology of Snail-Killing Sciomyzidae Flies*. Cambridge University Press, England, 506 pp.

Mohammadzade Namin, S., Razmjoo, F. and Madjdzadeh, S.M. 2015. The first record of *Euthycera hrabei* Rozkošný, 1969 (Diptera: Sciomyzidae) from Iran. *Ukrainska Entomofaunistyka*, 6(3): 22.

Mortelmans, J. 2015. The snail-killing fly *Salticella fasciata* new for the Netherlands, with an update of Belgian records (Diptera: Sciomyzidae). *Nederlandse Faunistische Mededelingen*, 44: 29–36.

Mortelmans, J., Volckaert, D., Kazerani, F., Mohammadzadeh Namin, S. and Talebi, A.A. 2016. New records of snail-killing flies (Diptera: Sciomyzidae) from Iran. *Bulletin de la Sociétéroyalebelged' Entomologie/ Bulletin van de Koninklijke Belgische Verenigingvoor Entomologie,* 152 (2): 133–140.

Motamedi, G.R., Dalimi, A.H., Akhavizadegan, M.A., Pilehchian Langrood, R., Abdigoudarzi, M. and Mohammadi, M. 2006. The biological effect of Sepedon (Diptera: Sciomyzidae) fly larvae living on Lymnea snails. Iranian *Journal of Veterinary Research*, 7(1): 62–65.

Rozkošný, R. 1984. *The Sciomyzidae (Diptera) of Fennoscandia and Denmark. Fauna Entomologica Scandinavica*. Scandinavian science press Ltd, Klampenborg, Denmark. 224 pp.

Rozkošný, R. 1987. A review of the Palaearctic Sciomyzidae (Diptera). *Folia Facultatis Scientiarum Naturalis Universitatis Purkyniae Brunensis, Biologia,* 86: 100 pp.

Rozkošný, R. and Elberg, K. 1984. Family Sciomyzidae (Tetanoceridae). pp: 167–193. *In*: Soos, Á. and Papp, L. (eds): *Catalogue of Palaearctic Diptera*. Vol. 9. Akadémiai Kiadó, Budapest.

Seddighi Sadr, F. and Mohammadzade Namin, S. 2016. The snail killing flies (Diptera, Sciomyzidae) in Gilan Province, with a new record for Iranian fauna. *Ukrainska Entomofaunistyka*, 7(1): 43–45.

Tothova, A., Rozkošný, R., Knutson, L.V. and Meier, R. 2013. A phylogenetic analysis of Sciomyzidae (Diptera) and some related genera. *Cladistics,* 29(4): 404–415.

Tirgari, S. and Fathpoor, H. 1974. On the biology and population of snail-killing flies of Northern Iran. *Sepedon sphegea* (F.) (Diptera: Sciomyzidae). *Fifth Plant Medicine Congress of Iran*, *Tabriz*, 120–122pp.

Tirgari, S. and Massoud, J. 1979. Improvement in laboratory rearing of immature stages of snail-killing fly *Sepedon sphegea* (Fabricius) and their survival (Insecta, Diptera, Sciomyzidae). *Iranian Journal of Public Health*, 7 (4): 164–174, 213–214. (In Persian)

Tirgari, S. and Massoud, J. 1981. *Study on the biology of snail-killing flies and prospect of biological control of aquatic snails Sepedonsphegea (Fabricius) (Insecta, Diptera, Sciomyzidae)*. School of Public Health and Institute of Public Health Researches - Tehran University of Medical Sciences, 66pp (In Persian).

Vala, J.C. 1989. *Diptères Sciomyzidae Euro-méditerranéens. Faune de France. France et Régions limitrophes*. N°72. Fédération Française de la Société des Sciences Naturelles, Paris, 300 pp.

Vala, J.C. and Leclercq, M. 1981. Taxonomie et répartition géographique des espèces du genre *Coremacera* Rondani, 1856, Sciomyzidae (Diptera) paléarctiques. *Bulletin de l'institInst royal de Sciences Naturelles de Belgique,* 53 (10): 1–13.

Vala, J.C., Murphy, W.L., Knutson, L. and Rozkošný, R. 2012. A cornucopia for Sciomyzidae (Diptera). *Studia dipterologica,* 19(1/2): 67–137.

Vala, J.C. and Knutson, L. 1990. Stades immatures et biologie de *Limnia unguicornis* (Scopoli), Diptère Sciomyzidae prédateur de mollusques. *Annales de la Société entomologique de France (Nouvelle Série),* 26(3): 443–450

Wagner, R., Bartak, M., Borkent, A., Courtney, G., Goddeeris, B., Haenni, J.P., Knutson L., Pont, A., Rotheray, G.E., Rozkosny, R., Sinclair, B., Woodley, N., Zatwarnicki, T. and Zwick, P. 2008. Global diversity of dipteran families (Insecta, Diptera) in freshwater (excluding Simulidae, Culicidae, Chironomidae, Tipulidae and Tabanidae). *Hydrobiologia*, 595: 489–519.

Yano, K. 1978. Faunal and biological studies on the insects of paddy fields in Asia. Part I. Introduction and Sciomyzidae from Asia (Diptera). *Esakia,* 11: 1–27.

# فون مگس‌های مرداب (Diptera: Sciomyzidae) در شمال غرب ایران همراه با اولین گزارش از جنس *Limnia* Robineau-Desvoidy, 1830 برای کشور

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**چکیده:** بررسی فون مرداب مگس‌ها (Dip., Sciomyzidae) درشمال غرب ایران طی سال‌های ۲۰۱۲-۲۰۱۵ انجام شد. درمجموع هشت گونه از مگس‌های خانواده Sciomyzidae جمع‌آوری و شناسایی شدند، که در میان آنها گونه *Limnia unguicornis* (Scopoli, 1763) برای اولین بار از ایران گزارش می‌شود. زیست شناسی، مشخصات افتراقی و یژگی های افتراقی گونه *L. unguicornis* ارایه شده است.

**واژگان کلیدی:** *Limnia*، رکورد جدید، غرب شمال ایران، Sciomyzidae