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New records of snail-killing flies (Diptera: Sciomyzidae) from Iran

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Abstract

During a two-week sampling campaign in Iran from April 17th to May 1th 2016, 15 species of snail-killing flies (Diptera: Sciomyzidae) were caught. Three species, *Pherbellia schoenherri, P. nana* and *P. ventralis* are mentioned for the first time from Iran. All species caught are commented in this paper and references to literature are given.

Keywords: Islamic Republic of Iran, Sciomyzidae, faunistics.

Samenvatting

Tijdens een twee week durende campagne in Iran van 17 April tot 1 Mei 2016, werden 15 soorten slakkendodende vliegen (Diptera: Sciomyzidae) ingezameld. Drie soorten, *Pherbellia schoenherri, P. nana* en *P. ventralis* worden voor de eerste keer uit Iran gemeld. Alle verzamelde soorten worden in deze paper becommentarieerd en voorzien van referenties.

Résumé

Pendant une campagne d'échantillonnage de deux semaines en Iran du 17 avril au 1er mai 2016, 15 espèces de Sciomyzidae (Diptera: Sciomyzidae) ont été capturées. Trois espèces, *Pherbellia schoenherri, P. nana* et *P. ventralis* sont mentionnées pour la première fois d'Iran. Toutes les espèces capturées sont commentées dans cet article et des références à la littérature sont données.

Introduction

Snail-killing flies are amongst the ecologically well-known families of dipterans in the world. The fact that their larvae prey on gastropods makes them interesting study organisms in applied ecology as biocontrol agents, as well as in fundamental ecology on the evolution of larval feeding behavior. For nearly half of all known species, extensive research has revealed their life cycles, immature stages and host preference (KNUTSON & VALA, 2011; MURPHYI *et al.,* 2012). All species of Sciomyzidae, with only few exceptions, are known to have malacophagous larvae feeding on several families of land and aquatic snails.
However, only little information is available on Iranian Sciomyzidae, and this scarce information is scattered into various publications and unpublished manuscripts. No checklist has been published yet. This paper aims to serve as a basis for further Sciomyzidae research in Iran.

Material and methods

From April 17th to May 1th 2016 several snail-killing flies were collected on 21 locations in 6 Iranian provinces. All material was collected by the first two authors, by sweep-netting vegetation. All material was pinned and is now stored in the personal collection of the first author. Material was identified by the first author. Last three authors made arrangements to collect in Iran and made it possible to collect and dispatch materials to Belgium. All data and metadata on which this publication is based is published online (MORTELMANS & VOLCKAERT, 2016).
A literature study revealed that the following papers listed in total 23 species of the family Sciomyzidae from Iran: YANO, 1968; BRATT, 1969; AYATOLLAHI, 1971; KNUTSON *et al*., 1973; TIRGARI & FATHPOOR, 1974; TIRGARI & LADDONI, 1978; YANO, 1978; TIRGARI & MASSOUD, 1978; TIRGARI & MASSOUD, 1981; VALA & LECLERCQ, 1981; KNUTSON & ORTH, 1986; ROZKOŠNÝ, 1987; ROZKOŠNÝ & ELBERG, 1991; MOTAMEDI *et al.,* 2006; MOHAMADZADE NAMIN *et al.*, 2016; SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016; HAMED *et al*., 2016. No collected specimens in museums were checked for this paper so it is possible these hold extra records.

Results

During the field inventory, 15 species from 9 genera were found, listed in table one, and published online (MORTELMANS & VOLCKAERT, 2016).

Table 1. Species list of Sciomyzidae that have been collected during the sampling campaign.

Nr.	Genus	Species	Field inventory	Literature
1	*Pherbellia*	*Pherbellia griseola*	Alborz province	KNUTSON *et al*., 1973; ROZKOŠNÝ & ELBERG, 1991
2		*Pherbellia nana*	Alborz province	
3		*Pherbellia cinerella*	Kerman province, Khuzestan province, Mazandaran province, Qazvin province, Alborz province	SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016; HAMED *et al*., 2016; ROZKOŠNÝ & ELBERG, 1991
4		*Pherbellia schoenherri*	Alborz province	
5		*Pherbellia* sp.	Mazandaran province	
6		*Pherbellia ventralis*	Mazandaran province	
7	*Ditaeniella*	*Ditaeniella grisescens*	Teheran province	KNUTSON *et al*., 1973; ROZKOŠNÝ & ELBERG, 1991
8	*Coremacera*	*Coremacera catenata*	Alborz province	SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016; ROZKOŠNÝ & ELBERG, 1991
9	*Sepedon*	*Sepedon spinipes*	Kerman province	KNUTSON *et al*., 1973, MOTAMEDI *et al.,* 2006; ROZKOŠNÝ & ELBERG, 1991
10		*Sepedon sphegea*	Teheran province, Alborz province, Kerman province	KNUTSON *et al*., 1973, MOTAMEDI *et al.,* 2006, TIRGARI & MASSOUD, 1978; ROZKOŠNÝ & ELBERG, 1991
11	*Hydromya*	*Hydromya dorsalis*	Kerman province, Khuzestan province, Mazandaran province, Alborz province	SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016; ROZKOŠNÝ & ELBERG, 1991
12	*Ilione*	*Ilione turcestanica*	Qazvin province, Kerman province	KNUTSON *et al*., 1973; HAMED *et al*., 2016
13	*Tetanocera*	*Tetanocera hyalipennis*	Mazandaran province	SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016
14	*Psacadina*	*Psacadina verbekei*	Alborz province	ROZKOŠNÝ & ELBERG, 1991
15	*Pherbina*	*Pherbina coryleti*	Alborz province, Mazandaran province, Kerman province	SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016; YANO, 1968; ROZKOŠNÝ & ELBERG, 1991

Twelve species, not caught on this sampling campaign, have been recorded before: *Coremacera amoena, Coremacera marginata, Colobaea iranica (=punctata,* pers.comm. Lloyd Knutson*), Ilione albiseta, Dichetophora obliterata, Trypetoptera punctulata, Euthycera hrabei, Euthycera stictica, Psacadina zernyi, Limnia unguicornis, Tetanocera arrogans* and *Salticella fasciata.*

Discussion

1. *Pherbellia griseola* (Fallen, 1820)

Pherbellia griseola is a common and widespread species with a Holarctic distribution (BRATT *et al.,* 1969) and known from Iran, as *Pherbellia fuscipes* (KNUTSON *et al.* 1973). Also ROZKOŠNÝ & ELBERG (1991) mention the species from Iran, without further details.
It is a relatively small and highly variable species with colours ranging from yellow-brown to dark-brown (VALA, 1989; ROZKOŠNÝ, 2002) (Fig. 1). The species can be swept easily from various types of moist habitats (incl. fens, pools, grasslands, marshlands...) (VALA 1989; SPEIGHT & KNUTSON, 2012) and it is found often present in large numbers. Adults are found from April to October (VALA, 1989; SPEIGHT & KNUTSON, 2012). Its larvae are living in exposed, freshwater snails (BRATT *et al.* , 1969).

Fig. 1. Male of *Pherbellia griseola* (Fallen, 1820), lateral view.

The species can best be identified with ROZKOŠNÝ (1984), VALA (1989) and ROZKOŠNÝ (1991) who give keys and drawings of terminalia.
During the trip, it was only found in a moist meadow with low, grassy vegetation in the North (Taleqan region), but here, in high densities (MORTELMANS & VOLCKAERT, 2016).

2. *Pherbellia nana* (Fallen, 1820)

Pherbellia nana is an exceptionally small *Pherbellia*, easily recognized by its size and wing markings. It has a wide Holarctic distribution (BRATT *et al.*, 1969). Specimens are found in a wide variety of habitats, from shaded forest pools to open, sunlit marshes (ROZKOŠNÝ, 1987). Adults are found from April to October (VALA, 1989; SPEIGHT & KNUTSON, 2012). Its larvae are found to attack both terrestrial as aquatic snails (BRATT *et al.*, 1969; ROZKOŠNÝ, 2002).
The species can best be identified with ROZKOŠNÝ (1984), VALA (1989) and ROZKOŠNÝ (1991) who give keys and drawings of terminalia.
During the trip, it was only found in the North (Taleqan) swept in very big numbers from a moist meadow, accompanied by *Pherbellia griseola.* This is, apparently, the first record for Iran (MORTELMANS & VOLCKAERT, 2016).

3. *Pherbellia cinerella* (Fallen, 1820)

P. cinerella is a dark and very characteristic *Pherbellia* and one of the easiest to recognise in the field by its long mid-frontal stripe and darkened anterior wing margin. It is a very common species (ROZKOŠNÝ, 1984) without much habitat and host affinity and it can be found all year long. The species is most often found in warm and dry habitats (e.g. coastal dunes, calcareous grassland, ...) where it can reach high abundances. The species is also encountered in moist vegetation albeit in lesser numbers. In fact, the species can be encountered nearly everywhere. *P. cinerella* has a broad range of host snails, both aquatic and terrestrial snails are attacked.

P. cinerella has a wide Palaearctic distribution and has been recorded in Iran (ROZKOŠNÝ & ELBERG, 1991, without further details; HAMED *et al*., 2016; SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016). The species can best be identified with ROZKOŠNÝ (1984), VALA (1989) and ROZKOŠNÝ (1991) who give keys and drawings of terminalia. It was encountered frequently and in high numbers during our trip (MORTELMANS & VOLCKAERT, 2016).

4. *Pherbellia schoenherri* (Fallen, 1826)

P. schoenherri is a very common and widespread species characterised by its heavily maculated wings. It has a very long flight period, mainly from April to October (SPEIGHT & KNUTSON, 2012), but in most European countries, it can be swept from vegetation all year round. It can be found in a very wide variety of both dry and moist habitats (SPEIGHT & KNUTSON, 2012). Its larvae prey specifically on *Succinea* sp. (VERBEKE, 1960).
The subspecies *P. s. schoenherri* can be found all over the Palaearctic region, but remarkably, no records from Iran are known. We found only one specimen during our trip, from Taleqan, swept besides a small stream on *Carex* vegetation (MORTELMANS & VOLCKAERT, 2016).
The species can best be identified with ROZKOŠNÝ (1984), VALA (1989) and ROZKOŠNÝ (1991) who give keys and drawings of terminalia.

5. *Pherbellia spec*. Robineau-Desvoidy, 1830

Three, probably undescribed, females from the ventralis group of *Pherbellia* were seen, of which one was collected. Females of the *Pherbellia ventralis* group (e.g. *P. silana, obscura, krivosheina*) are hard to separate and special care has to be taken while identifying. Moreover, it appears impossible to get to species level in many cases. This specimen is clearly outside the known variation of *Pherbellia ventralis* group species. Three specimens were swept from low vegetation, of which one was collected (MORTELMANS & VOLCKAERT, 2016).

6. *Pherbellia ventralis* (Fallen, 1820)

Pherbellia ventralis is a small species with body lengths up to 4.5 mm (ROZKOŠNÝ, 2002), characterised by the short mid-frontal stripe, dark grey to blue grey body which is in contrast to the yellowish brown abdomen. It is very difficult to separate *P. ventralis* from other species of the *Pherbellia ventralis*-group (e.g. *P. silana, obscura, krivosheina*) (SPEIGHT & KNUTSON, 2012).
Adults are found on various moist habitats (moist meadows, marshes, wet forest clearings, streams, ... (ROZKOŠNÝ, 2002; SPEIGHT & KNUTSON, 2012). *Pherbellia ventralis* has a long fly time from February to end of October (ROZKOŠNÝ, 2002) although most records are seen in spring and early summer
The species can best be identified with ROZKOŠNÝ (1984), VALA (1989) and ROZKOŠNÝ (1991) who give keys and drawings of terminalia. Care is needed, especially with females.
It is a widely distributed Palearctic species, with some records from North Africa (BRATT *et al.*, 1969). During our trip it was encountered only once, in the region Tonekabon, from a small, herbaceous stream amongst many *P. cinerella, Tetanocera* and *Pherbina*. This is, apparently, the first record for Iran (MORTELMANS & VOLCKAERT, 2016).

7. *Ditaeniella griscescens* (Meigen, 1830)

Ditaeniella grisecens is very similar to Pherbellia, but, it is quickly recognised due to the single pair orbital bristles (all other *Pherbellia* have two pairs). Adults appear to have preference for seasonally flooded grasslands (SPEIGHT & KNUTSON, 2012) but can be found in various types of wet vegetation (eg. ROZKOŠNÝ 1984). Its larvae are predators of freshwater and terrestrial gastropods of several families.
It is a widespread species all over the Palearctic region (incl. North Africa). This species is known from Iran (KNUTSON *et al*., 1973). We found it in the direct proximity of the Shur river near Parand.

The Shur river is an extremely salty river with broad margins of reed (MORTELMANS & VOLCKAERT, 2016).
The species can best be identified with ROZKOŠNÝ (1984) and VALA (1989) who give keys and drawings of terminalia.

8. *Coremacera catenata* (Loew, 1847)

Coremacera catenata is relatively rare Palaearctic species, only seen in low numbers. SPEIGHT & KNUTSON (2012) describe its habitat as open ground-forest and dry, shaded, grassy areas within *Pinus* forest. Its life history is only known partly: only the first-instar larvae is described (VALA, 1989).
This species can best be identified with VALA & LECLERCQ (1981) and VALA (1989) who give keys and drawings of terminalia.
The species is already known from Iran (VALA & LECLERCQ, 1981; ROZKOŠNÝ & ELBERG, 1991, without further details; SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016). During our trip, we collected several specimens from Banu Sahra on very dry, shaded, grassy vegetation next to a small stream (MORTELMANS & VOLCKAERT, 2016).

9. *Sepedon spinipes* (Scopoli, 1763)

S. spinipes is reddish-brown species of *Sepedon*, very common and widespread in the Holarctic region, inhabiting a wide range of habitats (see SPEIGHT & KNUTSON, 2012). NEFF & BERG (1966) depicted all developmental life stages: larvae are predators of aquatic snails. The species can be caught all year long, although main flight period is from March to October.
The species is previously known for Iran (KNUTSON *et al.*, 1973; ROZKOŠNÝ & ELBERG, 1991, without further details). During our trip, we encountered *S. spinipes* at only one location: Khosro shirin (MORTELMANS & VOLCKAERT, 2016). In contrast, MOTAMEDI *et al.* (2006) reported high number of specimens from Iran. Identification is best with VALA (1989) and ELBERG *et al.* (2009).

10. *Sepedon sphegea* (Fabricius, 1775)

S. sphegea is a blackish species of *Sepedon*, very common and widespread in the Palaearctic region. As its congener *S. spinipes*, it is inhabiting a wide range of habitats (see SPEIGHT & KNUTSON, 2012). NEFF & BERG (1966) depicted all developmental life stages: larvae are predators of aquatic snails. The species can be caught all year long, although main flight period is from March to October.
The species is previously known for Iran (KNUTSON *et al.*, 1973; FATHPOOR, 1974, KNUTSON & ORTH, 1986; ROZKOŠNÝ & ELBERG, 1991, without further details;). During our trip, *S. sphegea* was an extremely common species and encountered at nearly every locations (MORTELMANS & VOLCKAERT, 2016). Also MOTAMEDI *et al.* (2006) reported high number of specimens from Iran. Identification is best with VALA (1989) and ELBERG *et al.* (2009).

11. *Hydromya dorsalis* (Fabricius, 1775)

Hydromya is a monotypic genus of which males are easily recognized by two elongated processes on the anterior margin of the fourth abdominal sternite, a unique, but variable feature in this family (KNUTSON & BERG, 1963). In all Iranian material, the protuberances were of normal size (this is: not the reduced shaped as reported by KNUTSON & BERG, 1963). Larvae of *Hydromya dorsalis* are adapted for aquatic life and feed as predators on pulmonate snails (KNUTSON & BERG, 1963). Adults can be swept from vegetation all year round, but main flight period is April to October (SPEIGHT & KNUTSON, 2012).
H. dorsalis is known from a wide range of Palaearctic and Afrotropical countries, and appears to be a common species at all locations. It was previously reported from Iran by SEDDIGHI SADR & MOHAMADZADE NAMIN (2016). During our trip it was the most abundant species, together with *Sepedon sphegea*, collected from a wide range of habitats (MORTELMANS & VOLCKAERT, 2016).
Identification of both male and female is easy. ROZKOŠNÝ (1984) and VALA (1989) give keys and drawings of terminalia.

12. *Ilione turcestanica* (Hendel, 1903)

I. turcestanica is a species not easily recognised, but males have characteristic terminalia at sternite 4. Its habitus is figured in Figs 2-3). Its life history is described in VALA (1989), larvae attack several species of aquatic snails.
It is a Palearctic species, occurring from the East-Mediterranean basin to west of China (ROZKOŠNÝ & ELBERG, 1991). The species is known from Iran (KNUTSON *et al.,* 1973; HAMED *et al*., 2016). We found two couples at two locations: the Hidden Paradise and Taleqan region. Both locations are characterised by heavily shaded streams underneath trees. All specimens were swept from harsh, grassy vegetation (MORTELMANS & VOLCKAERT, 2016). Besides *I. turcestanica*, also *I. albiseta* (Hendel, 1903) has been recorded from Iran (YANO, 1978; SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016).
Identification can best be done with VERBEKE (1964) and VALA (1989).

Fig. 2. Male of *Ilione turcestanica* (Hendel, 1903).

Fig. 3. Male of *Ilione turcestanica* (Hendel, 1903).

13. *Tetanocera hyalipennis* Roser, 1840

T. hyalipennis is a species more easier to recognise in contrast to other *Tetanocera*. Both male and female possess the typical shiny undusted frons (e.g. VALA, 1989).
Parts of its life history are known and described. Its larvae are said to be predators of aquatic snails (KNUTSON, 1970). The species is caught in various types of habitat.
T. hyalipennis is a Palaearctic species, but only recorded for Iran earlier this year (SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016). We collected several specimens in the region of Tonekabon, from a small stream with wealthy, herbaceous vegetation (MORTELMANS & VOLCKAERT, 2016).

14. *Psacadina verbekei* Rozkošný, 1975

Psacadina are classically found in wealthy vegetation bordering water. Adults have heavily infuscated wings, superficially resembling *Pherbina*. Recognition of the species is easy, however careful examination is still necessary.
The life cycle of *P. verbekei* is described by KNUTSON *et al.* (1975): Larvae live in semiaquatic conditions. Both aquatic and terrestrial snails from moist environments are attacked. MURPHY *et al.* (2012) mentioned the importance of changing water levels, the snails are exposed to drought and easy to attack.
For identification, ROZKOŠNÝ (1984) and VALA (1989) give keys and drawings of terminalia. But it is especially KASSEBEER (2002) who finally gives good characters to discriminate both *P. verbekei* and *P. zernyi*. BARENDREGT *et al.* (2014) figures photographs of male genitalia.
The species is known from Iran (ROZKOŠNÝ & ELBERG, 1991, without further details), but no other literature references are known to us. We encountered the species on many locations and always in high numbers (MORTELMANS & VOLCKAERT, 2016).

15. *Pherbina coryleti (Scopoli, 1763)*

A large, characteristic and common species of snail-killing flies. Both sexes have the heavily infuscate wings. Males are unique in having the gonostyli with a tuft of hairs (e.g. VERBEKE, 1960). Females are more difficult to recognise due to the similarities to other females of *Pherbina* (e.g. *Pherbina intermedia* Verbeke, 1948).
The species has been recorded in Iran (YANO, 1978; ROZKOŠNÝ & ELBERG, 1991, without further details; SEDDIGHI SADR & MOHAMADZADE NAMIN, 2016). We encountered it only in the region of Tonekabon, in large numbers, from a small stream with wealthy, herbaceous vegetation (MORTELMANS & VOLCKAERT, 2016).

Conclusion

As demonstrated throughout the paper, it is clear only few papers are dealing with Iranian Sciomyzidae. A checklist is currently not available for the country and we tempted to give a good start for such a publication. During a short collecting trip like ours, new records for the country are found easily. No doubt, undescribed species are to be found from Iran.

Bibliography

AYATOLLAHI M., 1971. - Importance of the study of Diptera and their role in biological control. *Applied Entomology and Phytopathology,* 31: 20-28.

BARENDREGT A., MORTELMANS J. & VAN ZUIJLEN J.W., 2014. - Slakkendodende vliegen van het genus *Psacadina* in Nederland en België (Diptera: Sciomyzidae). *Nederlandse Faunistische Mededelingen,* 42: 37-45.

BRATT A. D., KNUTSON L.V., FOOTE A. & BERG C.O., 1969. - Biology of *Pherbellia* (Diptera: Sciomyzidae). *Memoirs of the New York Agricultural Experiment Station in Ithaca,* 404: 1-247.

ELBERG K., ROZKOŠNÝ R. & KNUTSON L.V., 2009. - A review of the Holarctic *Sepedon fuscipennis* and *S. spinipes* groups with description of a new species (Diptera: Sciomyzidae). *Zootaxa,* 2288: 51-60.

FATHPOOR H., 1974. - The Biology and Population of *Sepedon sphegea* (Fabricius) (snail killing fly) in North Part of Iran. (Diptera: Sciomyzidae). MPH thesis, *Tehran University of Medical Sciences - School of Public Health*, Iran. 82 pp.

HAMED E., KHAGHANINIA S., GHARAJEDAGHI Y. & VALA J- C. 2016. - Faunistic study of subfamily Sciomyzinae (Diptera: Sciomyzidae) in East-Azerbaijan province with 6 species as new records for Iran. *22th Iranian Plant protection congress*. University of Tehran, Karaj, Iran (poster presentation).

KASSEBEER C. F., 2002. – Zur unterscheidung der weibchen Europäischer *Psacadina* Enderlein, 1939 (Diptera: Sciomyzidae). *Dipteron,* 4(2): 157-162.

KNUTSON L. V. & BERG C. O., 1963. - Biology and immature stages of a snail-killing fly, *Hydromya dorsalis* (Fabricius) (Diptera: Sciomyzidae). *Proceedings of the Royal Entomological Society of London*, 38: 45-58.

KNUTSON L. V. & ORTH R. E., 1986. - The *Sepedon sphegea* complex in the Palaearctic and Oriental regions: identity, variation and distribution (Diptera: Sciomyzidae). *Annals of the Entomological Society of America,* 77: 687-701.

KNUTSON L. V. & VALA J-C., 2011. - *Biology of snail-killing Sciomyzidae flies*. Cambridge University Press, Cambridge, 506 pp.

KNUTSON L. V. 1970. - Biology of snail-killing flies in Sweden (Diptera: Sciomyzidae). *Entomologica Scandinavia,* 1(4): 307-314.

KNUTSON L. V., ROZKOŠNÝ R. & BERG C.O., 1975. - Biology and immature stages of *Pherbina* and *Psacadina* (Diptera: Sciomyzidae). *Acta Societatis Zoologicae Bohemicae,* 9(1): 1-38.

KNUTSON L. V., SHAGUDIAN E. R. &. 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.

MOHAMADZADE NAMIN S., RAZMJOO F., MADJDZADEH S. M., 2016. – The first record of *Euthycera hrabei* Rozkosny, 1969 (Diptera: Sciomyzidae) from Iran. *Ukrainska Entomofaunistyka*, 6(3): 22.

MORTELMANS J. & VOLCKAERT D., 2016. - New records of snail-killing flies (Diptera: Sciomyzidae) from Iran. v1.4. Belgium Biodiversity Platform. Dataset/Occurrence. doi:10.15468/cw73bc.

MOTAMEDI G. R., DALIMI ASL A. H., AKHAVIZADEGAN M. A., PILEHCHIAN LANGROOD R., ABDIGOUDARZI M. & 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.

MURPHY W. L., KNUTSON L. V., CHAPMAN E. G., MC DONNEL R. J., WILLIAM C. D., FOOTE B. A., VALA J-C., 2012. - Key aspects of the biology of snail-killing flies. *Annual Review of Entomology,* 57: 425-447.

NEFF S. E. & BERG C. O. 1966. - Biology and immature stages of malacophagous diptera of the genus *Sepedon* (Sciomyzidae). *Virginia Agricultural Experiment Stations Bulletin,* 566: 1-113.
ROZKOŠNÝ R. & ELBERG K., 1991. - Family Sciomyzidae (Tetanoceridae). *In*: SOÓS A. & PAPP L. (ed.), *Catalogue of Palaearctic Diptera. Vol. 9. Micropezidae-Agromyzidae.* Akad. Kiadó, Budapest. 460 pp.
ROZKOŠNÝ R., 1984. - *The Sciomyzidae (Diptera) of Fennoscandia and Denmark.* Fauna Entomologica Scandinavica 14. Scandinavian Scientific Press, Leiden-Copenhagen, 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., 1991. - A key to the Palaearctic species of *Pherbellia* Robineau Desvoidy, with descriptions of three new species (Diptera, Sciomyzidae). *Acta Societatis Entomologicae Bohemicae,* 88: 391-406.
ROZKOŠNÝ, R. 2002. - Insecta: Diptera: Sciomyzidae. *In*: SCHWOERBEL J. & ZWICK P. (ed.), *Süsswasserfauna von Mitteleuropa*. Spektrum, Akadamische Verleitung Heidelberg and Berlin. 68 pp.
SEDDIGHI SADR F. & MOHAMADZADE 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.
SPEIGHT M. C. D. & KNUTSON L. V., 2012. - Species accounts for Sciomyzidae and Phaeomyiidae (Diptera) known from the Atlantic zone of Europe. *Dipterist Digest,* 19: 1-38.
TIRGARI S. & 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*; University of Azarabadegan, Tabriz, Iran. (poster presentation).
TIRGARI S. & LADDONI H., 1978. - Sex ratio in snail-killing flies. *Sepedon sphegea* (F.). (Insecta, Diptera, Sciomyzidae). *Iranian Journal of Public Health,* 7(1): 32-38.
TIRGARI S. & MASSOUD J. 1981. - *Study on the biology of snail-killing flies and prospect of biological control of aquatic snails Sepedon sphegea (Fabricius) (Insecta, Diptera, Sciomyzidae).* Science Publication 2051, School of Public Health and Institute of Public Health Researches - Tehran University of Medical Sciences. 15 pp.
TIRGARI S. & MASSOUD J., 1978. - 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.
VALA J.-C., 1989. - *Diptères Sciomyzidae Euro-méditerranéens*. Faune de France. France et Régions limitrophes. N° 72. Fédération Française des Sociétés de Sciences Naturelles, Paris, 300 pp.
VALA J.-C. & LECLERCQ M. 1981. - Taxonomie et répartition géographique des espèces du genre *Coremacera* Rondani, 1856, Sciomyzidae (Diptera) Paléarctiques. *Bulletin Institut royal des Sciences naturelles de Belgique,* 53(10): 1-13.
VERBEKE J. 1960. - Révision du genre *Pherbina* Robineau Desvoidy (Diptera: Sciomyzidae). *Bulletin Institut royal des Sciences naturelles de Belgique,* 36(34): 1 15.
VERBEKE J. 1964. - Contribution à l'étude des diptères malacophages. III. Révision du genre *Knutsonia* nom. nov. (= *Elgiva* Auct.). *Bulletin Institut royal des Sciences naturelles de Belgique,* 40(9): 1-44.
YANO K. 1968. - Notes on Sciomyzidae collected in paddy field (Diptera). *Mushi,* 41(15): 189-200.
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.