



The Chalcidoid wasp assemblage (Hymenoptera: Chalcidoidea) associated with the common reed, *Phragmites australis* in Iran

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ABSTRACT. Samples of the common reed, *Phragmites australis* (Cav.) Trin. ex Steud. (Poaceae), were collected in a survey conducted in the south of West Azarbaijan province, Iran, from 2021 to 2023. The plant tissues were transported to the Entomology Laboratory of Urmia University, where chalcidoid wasps were obtained through laboratory rearing. The chalcidoid wasps obtained from the laboratory rearing included 11 species in 10 genera belonging to six families: *Eurytoma crassinervis* Thomson, 1876; *E. ochraceipes* Kalina, 1970; *Sycophila mellea* Curtis, 1831; *Tetramesa albomaculatum* Ashmead, 1894 (Eurytomidae), *Cerchysius subplanus* Dalman, 1820; *Mayridia formosula* Mercet, 1921 (Encyrtidae), *Asaphes suspensus* Nees, 1834; *Halticoptera patellana* Dalman, 1818; *Homoporus arestor* Walker, 1848, *Sphegigaster nigricornis* Nees, 1834 (Pteromalidae) and *Oodera formosa* Giraud, 1863 (Ooderidae). Among the identified species, two are new records for the Iranian fauna: *Eurytoma crassinervis* and *Tetramesa albomaculatum*.

Keywords: common reed, checklist, biological control, new record, parasitoid, West Azarbaijan

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INTRODUCTION

Phragmites Adanson, 1763 (Poaceae) are the largest perennial reed grasses found in the marsh, especially in temperate and tropical areas, with four species worldwide (Farouk et al., 2023). It is spread quickly in some parts of its distribution (Kiviat, 2013; Srivastava et al., 2014). The common reed, *P. australis* is known to host an enormous diversity of insect species worldwide which are responsible for significant damage to it. Of these, at least 140 herbivorous species are associated with the common reed in Europe (Schwarzländer & Häfliger, 1999; Tewksbury et al., 2002). Among these insect species, more than 70% attack the leaves and the stems (Tewksbury et al., 2002).

The superfamily Chalcidoidea (Hymenoptera) is one of the most abundant, speciose, and biologically diverse groups of insects. Chalcidoidea account for roughly one-third of the world's parasitic species of Hymenoptera (LaSalle & Gauld, 1991). Their extensive feeding diversity and behavioural complexity, even in a single species, have made studying difficult (Gordh, 1979). Chalcidoidea represents a significant portion of the biological diversity found in terrestrial ecosystems and play a major role in regulating populations of terrestrial insects (LaSalle & Gauld, 1991). Most Chalcidoidea are parasitoids of other insects, and they have been used extensively in the biological control of insect pests (Greathead, 1986). Some successful biological control projects of insect pests have

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used chalcidoids to achieve substantial or complete control (Greathead, 1986). More than 65 species of Chalcidoidea from nine families have been reported as associated with *P. australis* (UCD Community, 2023). In a recent study by Lotfalizadeh et al. (2020a), 14 species from six families Encyrtidae, Eulophidae, Eupelmidae, Eurytomidae, Pteromalidae and Torymidae were identified in Iran. In a study conducted by Karimpour (2014) on the biology of the common reed gall-forming fly, *Tetrastichus legionarius* Giraud (Hym.: Eulophidae) has been reported as a parasitoid of *Lipara lucens* Meigen. One species of Eurytomidae was reported in association with *P. australis* in the UK by Jenning (2020). According to Hansen et al. (2012), *Bothriothorax ghesquieri* Ferrière, 1956 (Hymenoptera: Encyrtidae) was hatched from *Lipara* galls (Diptera, Chloropidae) on *Phragmites australis*. Several species of Chalcidoidea from 10 chalcidoid families that are parasitoids of grass flies (Diptera: Chlorophidae) were reared as associated with *Phragmites* and reported by Nartshuk (2006). Common reed is an invasive, aggressive nature and ecologically detrimental plant in the world, cheap and readily available as a raw material (Köbbing et al., 2023). In summer, it was used centuries as a silage plant and in the winter as a raw material for crafts and for construction materials, including roofing (Lotfalizadeh et al., 2020a).

The present study aims to investigate the Chalcidoid community associated with the common reed (*Phragmites australis*) in Northwestern Iran. This research will contribute to our understanding of the local fauna by reporting new records and examining the relationships between these insects and their hosts.

MATERIAL AND METHODS

From 2021 to 2023, during our collection program of parasitic wasps in southern West Azarbaijan province, we gathered potentially infested common reed stems. Samples were taken from approximately 40 cm below the top of the stems, which ranged in height from 40 to 140 cm. The collected reed stems were transported to the laboratory and placed into prepared glass boxes (30×40×80 cm), organized by the corresponding area, and covered with muslin for the maintenance and rearing of insects in the entomology laboratory. The specimens were monitored daily in the ambient conditions of 15 to 24°C, with relative humidity between 40% and 60%, and the emerging wasps were transferred to 75% alcohol. The collected specimens were prepared and mounted according to the methods described by Noyes (1982). For card-mounting, rectangular cards measuring 0.5×1.5 cm were used, with water-soluble glue applied to secure the specimens onto these cards (Noyes, 1982). The reared specimens were identified using identification keys and descriptions of the family Encyrtidae (Japoshvili & Noyes, 2005; Hansen et al., 2012; Trjapitzin, 2017; Japoshvili et al., 2023); the family Eurytomidae (Claridge, 1961; Zerova, 1976; Zerova & Fursov, 2016; Zerova & Seryogina, 1998); the family Ooderidae (Bouček & Rasplus, 1991; Rahmani et al., 2023); the family Ormyridae (Askew, 1994; Lotfalizadeh et al., 2012a); the family Pteromalidae (Bouček, 1958; Bouček & Rasplus, 1991; Tselikh, 2019).

External morphology was illustrated using Photographs taken using a Canon® EOS 700D (Canon Inc., Japan), mounted on a manually focused stage on a horizontal rail (Omega Optics Co. Ltd., Iran). A Nikon 4× Plan objective was mounted to the camera using a tubular adaptor (160 mm - Omega Optics Co. Ltd., Iran). Triple LED panels (3×20 w, 20 × 20 cm) were used to provide a smooth and diffused light covering all aspects of the specimens. The series of 100–120 partially focused images were stacked into a single in-focus image using Helicon Focus® v. 7 (Helicon Soft Ltd., Kharkiv, Ukraine). Stacked photos were retouched using Adobe Photoshop® CS6 software. The identified specimens were deposited in the collection of the Plant Protection Department at Urmia University (PPDUU).

RESULTS

We reared 11 chalcidoid species associated with the common reed (*P. australis*) from West Azarbaijan province, belonging to 10 genera and six families, including Eurytomidae (four species), Encyrtidae (two species) Pteromalidae (four species), and Ooderidae (one species). Among these, two species *Eurytoma crassinervis* Thomson, 1876 and *Tetramesa albomaculatum* Ashmead, 1894 were sampled for the first time in Iran. Therefore, out of the 13 species, seven are recorded for the first time from West Azarbaijan province, associated with *P. australis*.

Taxonomic hierarchy

Order Hymenoptera Linnaeus, 1758

Superfamily Chalcidoidea Latreille, 1817

Family Encyrtidae Walker, 1837

Genus *Mayridia* Mercet, 1921

***Mayridia formosula* Mercet, 1921**

Material examined. 2♀♀, IRAN - West Azarbaijan Province, Bukan, 36°29'9.088" N, 46°11'6.502"E, 1327 m a.s.l., 20.ix.2023; S. Salimi leg.; 2♀♀, Shahin Dezh, 36°43'52.930"N, 46°28'12.312"E, 1328 m a.s.l., 13.xi.2023, *ibid.*

Distribution. Armenia, Bulgaria, Croatia, Czech Republic, Kazakhstan, Greece, Hungary, Italy, Moldova, Mongolia, Portugal, Romania, Russia, Slovakia, Spain, Turkey (UCD Community, 2023). Iran: Abd-Rabou et al., (2011). The later report is doubtful because voucher specimens are unavailable for confirmation. Our current report indicates the distribution of this species in Iran.

Genus *Cerchysius* Westwood, 1832

***Cerchysius subplanus* Dalman, 1820**

Material examined. 1♀, IRAN - West Azarbaijan Province, Miandoab, 36°56'31.644"N, 45°59'46.684"E, 1286 m a.s.l., 25.viii.2023, S. Salimi leg.; 1♀, Naqadeh, 36°58'27.196"N, 45°18'31.053"E, 1331 m a.s.l., 05.x.2023, *ibid.*

Distribution. Afghanistan, Armenia, China, Croatia, Czech Republic, Hungary, Ireland, Latvia, Moldova, Mongolia, Netherlands, North Korea, Norway, Portugal, Siberia, Slovakia, Sweden, Thailand, Turkey, United Kingdom (UCD Community, 2023); Iran: Mazandaran (Sakenin et al., 2019 - needs to be confirmed), West Azarbaijan (**new record**).

Family Eurytomidae Walker, 1832

Genus *Eurytoma* Illiger, 1807

***Eurytoma crassinervis* Thomson, 1876 (Fig. 1A)**

Material examined. 1♀, IRAN - West Azarbaijan Province, Miandoab, 36°57'22.019"N, 46°4'49.495" E, 1291 m a.s.l., 15.xiii.2023, S. Salimi leg.; 1♀, Bukan, 36°29'37.749" N, 46°11'13.879" E, 1329 m a.s.l., 20.ix.2023, *ibid.*

Distribution. Bulgaria, Czech Republic, France, Germany, Hungary, Iran (**new record**), Netherlands, Poland, Sweden, Switzerland, Tadzhikistan, and the United Kingdom (UCD Community, 2023).

Diagnosis. This species can be discriminated from its nearly allied species, *E. harmolitarum* Erdős with its darkened and relatively enlarged marginal vein. Body mainly black in females and males. Body slender, with an elongated abdomen. Postgenal lamina present, ventrally raised as a tooth, postgena with ventral depression, genal carina forming blunt angle. Adscrobal carina of mesopleuron not reaching mesocoxal foramina ventrally; anterior outline of mesopleuron convex in front of mesocoxae, propodeum with median furrow clearly impressed. Fore coxa with a depression on anterior side, and with a S-like ridge dorsally, mesocoxa with lamella. Epicnemium not completely delimited, mesopleuron with incomplete adscrobal carina (not joining ventrally mesocoxal foramina); mesopleuron without ventral shelf. Marginal vein longer than the stigmal vein. Gaster distinctly petiolate, with short petiole, the 4th gastral tergite longer than others.

***Eurytoma ochraceipes* Kalina, 1970**

Material examined. 2♀♀, IRAN-West Azarbaijan Province, Mahabad, 36°45'29.724" N, 45°42'19.573"E, 1371 m a.s.l., 20.viii.2023, S. Salimi leg.; 1♀, Piranshahr, 36°40'54.571" N, 45°10'5.544" E, 1416 m a.s.l., 10.vii.2023, *ibid.*

Distribution. Bulgaria, Croatia, France, Israel, Turkey, Vietnam, Yemen (UCD Community, 2023), Northwestern Iran (Lotfalizadeh & Gharali, 2012).

Genus *Sycophila* Walker, 1871

Sycophila mellea Curtis, 1831

Material examined. 3♀♀, IRAN - West Azarbaijan Province, Miandoab, 36°55'42.248"N, 46°5'25.338"E, 1290 m a.s.l., 25. viii.2023, S. Salimi leg.; 2♀♀, Mahabad, 36°48'19.741"N, 45°43'43.928"E, 1302 m a.s.l., 20.viii.2023, *ibid.*; 6♂♂, Piranshahr, 36°43'59.863"N, 45°11'45.657"E, 1438 m a.s.l., 10.vii.2023, *ibid.*

Distribution. Croatia, England, France, Germany, Hungary, Netherlands, Romania, Sweden, Turkey, United Kingdom, Wales (UCD Community, 2023), Iran (East Azarbaijan, Golestan, Mazandaran) (Lotfalizadeh & Gharali, 2008).

Genus *Tetramesa* Walker, 1832

Tetramesa albomaculatum Ashmead, 1894 (Fig. 1B)

Material examined. 4♀♀, IRAN - West Azarbaijan Province, Piranshahr, 36°40'48.779"N, 45°12'12.269"E, 1401 m a.s.l., 08.v.2023, S. Salimi leg.; 3♀♀, Piranshahr, 36°44'55.328"N, 45°11'25.882"E, 1455 m a.s.l., 10.vii.2023, *ibid.*; 5♂♂ Miandoab, 36°58'53.855"N, 46°12'52.756" E, 1312 m a.s.l., 25.viii.2023, *ibid.*; 6♂♂ Miandoab, 36°59'53.088"N, 45°59'17.021"E, 1283 m a.s.l., 27.ix.2023, *ibid.*

Distribution. Germany, Sweden, USA (UCD Community, 2023), Iran (**new record**).

Diagnosis. *Tetramesa albomaculatum* belongs to *longicornis* species group of the genus *Tetramesa* (Claridge, 1961). Body black, with legs predominantly black, pronotum with large yellow pronotal spots. Body is elongated, slender with slightly convex thorax. Pronotum short, 0.5 times longer than broad. Head and thorax highly polished, with finely superficial sculpture. Female antennae with 5 elongate funiculars and 3 clavomeres. Propodeum with median furrow, reticulated in sublaterally. Marginal vein noticeably longer than stigmal and postmarginal veins (Fig. 1B). This species is similar to *Tetramesa novalis* Zerova with a slightly wider long head and a body length of more than 2 mm, but it can be separated by a longer postmarginal vein than the stigmal vein (slightly shorter in *T. novalis*), funiculars longer than broad (funiculars considerably elongate in *T. novalis*).

Family Pteramalidae Dalman, 1820

Genus *Asaphes* Walker, 1834

Asaphes suspensus Nees, 1834

Material examined. 1♀, IRAN - West Azarbaijan Province, Mahabad, 36°55'4.701"N, 45°45'59.826"E, 1287 m a.s.l., 20. viii.2023, S. Salimi leg.; 1♀, Bukan, 36°37'37.253"N, 46°9'41.182"E, 1316 m a.s.l., 20.ix.2023, *ibid.*; 1♀, Piranshahr, 36°47'59.469"N, 45°14'51.051"E, 1453 m a.s.l., 10.vii.2023, Y. Karimpour leg.

Distribution. Belgium, Bulgaria, China, Croatia, Czech Republic, Kazakhstan, England, France, Germany, India, Iran, Israel, Italy, Japan, Korea, Morocco, Nepal, Netherlands, Norway, Pakistan, Poland, Portugal, Romania, Serbia, Slovakia, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom (UCD Community, 2023); Iran: Ardabil (Ghafouri-Moghaddam et al., 2014), East Azarbaijan (Lotfalizadeh & Gharali, 2008).

Genus *Halticoptera* Spinola, 1811

Halticoptera patellana Dalman, 1818

Material examined. 2♀♀, IRAN - West Azarbaijan Province, Miandoab, 36°51'5.465"N, 46°6'40.731"E, 1293 m a.s.l., 27.ix.2023, S. Salimi leg.; 1♀, Shahin Dezh; 36°48'32.126"N, 46°22'47.254"E, 1315 m a.s.l., 13.xi.2023; *ibid.*

Distribution. Belgium, Brazil, Chile, Colorado, Czech Republic, France, Germany, Mongolia, Ireland, Italy, Japan, Mexico, Montenegro, Netherlands, Peru, Romania, Russia, Sweden, Switzerland, Taiwan, Trinidad and Tobago, Turkey, United Kingdom (UCD Community, 2023); Iran: East Azarbaijan (Lotfalizadeh & Gharali, 2008, as *Halticoptera* near *patellana*).

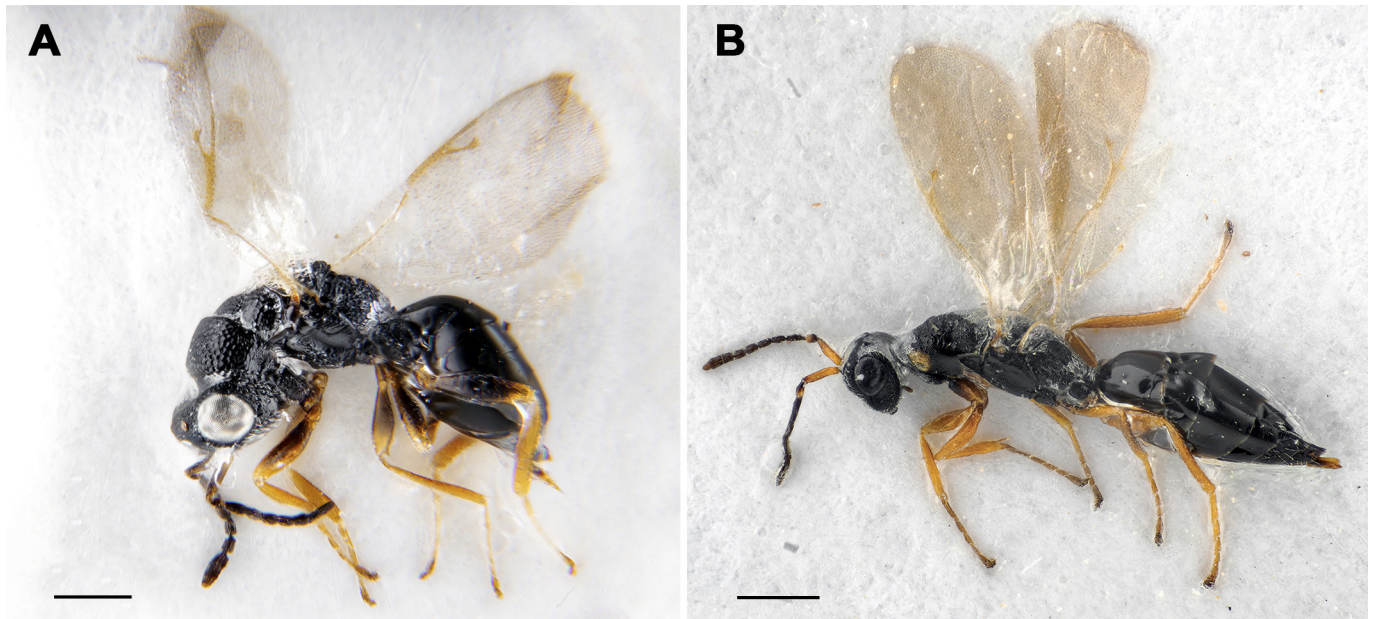


Figure 1. General habitus of female, lateral view; **A.** *Eurytoma crassinervis* Thomson, 1876; **B.** *Tetramesa albomaculatum* Ashmead, 1894. (Scale bar=500µm).

Genus *Homoporus* Thomson, 1878

Homoporus arestor Walker, 1848

Material examined. 2♀♀, IRAN - Azarbaijan Province, Miandoab, 37°4'38.213"N, 46°8'7.249"E, 1312 m a.s.l., 15.viii.2023, S. Salimi leg.; 3♀♀, Piranshahr, 36°46'7.613"N, 45°18'57.008"E, 1450 m a.s.l., 10.vii.2023, Y. Karimpour leg.

Distribution. Bulgaria, Czech Republic, France, Germany, Moldova, Slovakia, Spain, Sweden, Turkey, United Kingdom (UCD Community, 2023); Iran: Mazandaran Province, Tonekabon (Rahmani et al., 2022).

Genus *Sphegigaster* Spinola, 1811

Sphegigaster nigricornis Nees, 1834

Material examined. 1♀, IRAN - West Azarbaijan Province, Bukan, 36°26'7.023"N, 46°9'36.238"E, 1365 m a.s.l., 20.ix.2023, S. Salimi leg.; 1♀, Shahin Dezh, 36°45'44.840"N, 46°26'58.154"E, 1327 m a.s.l., 13.vi.2023, ibid.

Distribution. Belgium, Bulgaria, Czech Republic, Kazakhstan, England, Europe, France, Germany, Hungary, Netherlands, Romania, Spain, Sweden, Switzerland, United Kingdom (UCD Community, 2023), Iran: East Azarbaijan, Ilam (Lotfalizadeh & Gharali, 2008).

Family Ormyridae Förster, 1856

Genus *Ormyrus* Westwood, 1832

Ormyrus orientalis Walker, 1871

Material examined. 1♀, IRAN - South of West Azarbaijan Province, Mahabad, 36°50'41.728"N, 45°45'37.578"E, 1296 m a.s.l., 20.viii.2023, S. Salimi leg.; 1♀, Naqadeh, 37°1'11.058"N, 45°25'48.583"E, 1281 m a.s.l., 05.x.2023, ibid.

Distribution. Afghanistan, Azerbaijan, Belarus, Bulgaria, Croatia, Czech Republic, Dominican Republic, France, Georgia, Germany, Greece, Hungary, India, Iraq, Italy, Macedonia, Moldova, Montenegro, Pakistan, Russia, Serbia, Slovakia, Spain, Turkey, Turkmenistan, Ukraine (UCD Community, 2023); Iran: Chaharmahal & Bakhtiari, East Azarbaijan, Isfahan (Lotfalizadeh et al., 2012a; Lotfalizadeh & Gharali, 2014), Qazvin, Razavi Khorasan (Lotfalizadeh et al., 2012a).

Family Ooderidae Bouček, 1958

Genus *Oodera* Westwood, 1874

Oodera formosa Giraud, 1863

Material examined. 1♀, IRAN - West Azarbaijan Province, Shahin Dezh, 36°34'14.830"N, 46°33'17.594"E, 1356 m a.s.l., 13.vi.2023, S. Salimi leg.; 1♀, Naqadeh, 36°58'8.434"N, 45°35'36.901"E, 1277 m a.s.l., 05.x.2023, *ibid*.

Distribution. Austria, Croatia, France, Italy, Romania, Serbia (UCD Community, 2023); Iran: Kordestan (Lotfalizadeh et al., 2017), Isfahan and Kermanshah (Rahmani et al., 2023).

DISCUSSION

The present study reports the first records of two Chalcidoidea species, *E. crassinervis* and *T. albomaculatum* (Eurytomidae), from Iran. Among the 11 species reared from *Phragmites* in this research, five were recorded for the first time from West Azarbaijan province, with no previous plant associations reported for these species (Table 1). Only *E. crassinervis* has been previously reported on *Phragmites australis* (Jennings, 2020). The other species were obtained from various insect hosts associated with the common reed. Three families, Encyrtidae, Eurytomidae and Pteromalidae, each with seven species from 7, 4 and 6 genera, respectively, are the most common taxa associated with *P. australis*. The families Encyrtidae, Pteromalidae and Eurytomidae, with 36, 17 and 10 species, respectively, from 22, 12 and 4 genera, are the most common in the world scale associated with *P. australis* (UCD Community, 2023). Hitherto, five species of Encyrtidae were reported as associated with reed in Iran (Lotfalizadeh et al., 2020a), and we included two encyrtids (Table 1). These two species, including five previously reported species (Lotfalizadeh et al., 2020a), are parasitoids of the mealybugs family (Hemiptera: Pseudococcidae) on reed. Their association with the reed is new, and *Mayridia formosula* was reported as a parasitoid of *Trionymus aberrans* Gonx, 1938 (Hemiptera: Pseudococcidae) on wheat (Japoshvili & Noyes, 2005). *Cerchysius subplanus* is a common primary parasitoid of dipterans from the family Chamaemyiidae and the families Eriococcidae and Pseudococcidae (Hemiptera) (Japoshvili et al., 2023).

Only three species of Eurytomidae were reported on *P. australis* in Iran (Lotfalizadeh et al., 2020a) and we included four species from three eurytomid genera (Table 1). *Tetramesa albomaculatum*, *T. phragmitis* and an unknown species are phytophagous species and the rest are known as parasitoids of phytophagous insects. *Eurytoma crassinervis*, *E. ochraceipes* and *S. mellea* are parasitoids of gall maker insects. Therefore, several species of *Tetramesa* (Lotfalizadeh et al., 2020a) and gall midge, such as *Giraudiella inclusa* (Frauenfeld, 1862) (Karimpour et al., 2022), that were reported from studied areas can be potential hosts of these eurytomid species on the reed. Among these eurytomid species, only *E. crassinervis* has previously been reported from *P. australis* (Jennings, 2020). It may be an ectoparasitoid of gall-maker insects. It belongs to the *Eurytoma appendigaster* species group, which is mainly parasitoid of gall-maker *Tetramesa* (Hymenoptera: Eurytomidae) (Lotfalizadeh et al., 2007). *Eurytoma ochraceipes* was collected from *Phragmites* for the first time in this research. Additionally, it was reported from cecidomyiids galls on *Ceratoides papposa* Botsch. & Ikonn. (Chenopodiaceae), in the southern Palaearctic (Zerova, 1995). This species belongs to the *pistaciae* group of *Eurytoma* (Lotfalizadeh et al., 2007). During a recent phylogenetic study, Lotfalizadeh et al. (2024) proposed new taxonomic changes in the genus, including some new species from the Afrotropical region, which led to an exceptional escape in the number of species up to 156. It includes 16 species identified in the Palaearctic region (Belokobylskij et al., 2019). *Sycophila mellea* was reported by Lotfalizadeh (2008) from Iran. According to Lotfalizadeh (2008), its main hosts are species of the genus *Tetramesa* Walker (Eurytomidae), which are gall-makers on Poaceae. Also, this species is a primary parasitoid of the families Cecidomyiidae (Diptera), Kermesidae (Hemiptera) and Cynipidae, as well as Eurytomidae (Hymenoptera). We reared four additional pteromalid species to three previously recorded species by Lotfalizadeh et al. (2020a). In this research, *A. suspensus* was collected from an aphid *Pemphigus spyrothecae* Passerini (Hemiptera: Aphididae) associated with *Phragmites*. *Asaphes suspensus* is a generalist hyperparasitoid of four to five genera of Aphidinae and Aphelinidae (Hymenoptera) primary parasitoids (Sullivan, 1987).

Table 1. Reported associated Chalcidoidea with *Phragmites australis* in Iran and their possible hosts.

Family	Species	Potential hosts
Encyrtidae	<i>Anagyrus nr alienus</i> Japoshvili, 2012	Pseudococcidae**
	<i>Asitus</i> sp.	Pseudococcidae**
	<i>Cerchysius subplanus</i> Dalman, 1820	Pseudococcidae*
	<i>Cheiloneurus paralia</i> (Walker, 1837)	Pseudococcidae**
	<i>Echthroplexiella obscura</i> (Hoffer, 1954)	Pseudococcidae**
	<i>Neococcidencyrtus poutiersi</i> (Mercet, 1922)	Diaspididae**
	<i>Mayridia formosula</i> Mercet, 1921	Pseudococcidae*
Eulophidae	<i>Aprostocetus orithyia</i> (Walker, 1839)	Cecidomyiidae, Chloropidae**
Eupelmidae	<i>Eupelmus phragmitis</i> Erdös, 1955	Eurytomidae**
Eurytomidae	<i>Aximopsis deserticola</i> (Zerova, 2004)	-
	<i>Eurytoma crassinervis</i> Thomson, 1876	Cecidomyiidae and Eurytomidae*
	<i>Eurytoma ochraceipes</i> Kalina, 1970	Cecidomyiidae*
	<i>Sycophila mellea</i> Curtis, 1831	Cecidomyiidae and Eurytomidae*
	<i>Tetramesa albomaculatum</i> Ashmead, 1894	Phytophagous (gall-maker) *
	<i>Tetramesa phragmitis</i> (Erdös, 1952)	Phytophagous (gall-maker)**
	<i>Tetramesa</i> sp.	Phytophagous (gall-maker)**
Pteromalidae	<i>Asaphes suspensus</i> Nees, 1834	Aphididae*
	<i>Halticoptera patellana</i> Dalman, 1818	Agromyzidae*
	<i>Homoporus arestor</i> Walker, 1848	Cecidomyiidae and Eurytomidae*
	<i>Homoporus febriculosus</i> (Girault, 1917)	Cecidomyiidae, Chloropidae, Eurytomidae**
	<i>Norbanus persicus</i> Lotfalizadeh & Rasplus, 2020	Crambidae**
	<i>Sphegigaster nigricornis</i> Nees, 1834	Agromyzidae, Apionidae*
	<i>Stenomalina delvarei</i> Lotfalizadeh & Rasplus, 2020	Chloropidae**
Ormyridae	<i>Ormyrus orientalis</i> Walker, 1871	Cecidomyiidae*
Ooderidae	<i>Oodera formosa</i> Giraud, 1863	Buprestidae, Curculionidae*
Torymidae	<i>Torymus arundinis</i> (Walker, 1833)	Cecidomyiidae**

* Current study - ** Lotfalizadeh et al. (2020a)

Ghafouri Moghaddam et al. (2014) recorded this species on the spiral gall Aphid, *Pemphigus spyrothecae* (Passerini, 1860) in Northwestern Iran. *Halticoptera patellana* were reared for the first time on the common reed, and dipterous families Cecidomyiidae and Chloropidae can be its potential hosts. However, it is primary parasitoid of coleopterans from the family Curculionidae (Scolytinae), dipterans from the families Agromyzidae, Cecidomyiidae, Chloropidae, Drosophilidae and Tephritidae, as well as lepidopterans from the family Lyonetiidae (Bouček & Rasplus, 1991).

This is the first report of the biological association of *Homoporus arestor* with *Phragmites*. However, it is a primary parasitoid of phytophagous Eurytomidae, including *Eurytoma* Ilgner and *Tetramesa* Walker, which have been recorded on the plants of the family Poaceae (Vikberg, 2019; Lotfalizadeh et al., 2020b). Since three species of *Tetramesa* (Lotfalizadeh et al., 2020a) and two species of *Eurytoma* (current study) have been collected and identified from common reed in the same area, it can be concluded that these species are hosts for *H. arestor*. Although species of Agromyzidae, Chloropidae and Cecidomyiidae have also been recorded as hosts for *Homoporus* species (Vikberg, 2019), some of these species have also been recorded on common reed in recent studies. *Sphegigaster nigricornis* is recognized as a primary parasitoid of the families Apionidae (Coleoptera) and Agromyzidae (Diptera) (Tselikh, 2019). In Iran, there are eight known species of the genus *Sphegigaster* (Shojaey et al., 2021; Rahmani et al., 2022). There is no previous report on the association of Ormyridae and *Ormyrus orientalis* with common reed (UCD Community, 2023; Lotfalizadeh et al., 2020a). This species is a primary and secondary parasitoid of dipterans from the families Agromyzidae, Cecidomyiidae, Lonchaeidae and Tephritidae and hymenopterans from the family Cynipidae (Askew, 1994; Zerova & Seryogina, 1998, Lotfalizadeh et al., 2012a). The dipterous families Agromyzidae and Cecidomyiidae can be the potential hosts of *O. orientalis* on *P. australis*.

This is the first record of association of the recently erected family Ooderidae with the common reed. The genus *Oodera* is distributed in the Palaearctic, Oriental and Afrotropical regions (UCD Community, 2023). The number of species *Oodera* throughout the world, the Palaearctic region and the Middle East are 15, 6 and 2 species, respectively (Belokobylskij et al., 2019; Nazemi-Rafie et al., 2011; Rahmani et al., 2023). Two species, namely *Oodera formosa* and *Oodera punctulata* Rahmani & Rakhshani, 2023, are distributed in Iran. Almost all *Oodera* species are reported as parasitoids of xylophagous beetle larvae of the families Buprestidae and Curculionidae (Coleoptera, Scolytinae) (Bouček, 1958), but the accurate host of *O. formosa* on the common reed is unknown. Some of these host associations have been reported previously for other plant species. For example, *M. formosula*, *S. mellea* and species of *Tetramesa* and *Homoporus* have been recorded from Cynipidae, Cecidomyiidae galls and Eurytomidae on other Poaceae (Lotfalizadeh et al., 2012b, 2020b). According to the literature, *H. patellana* and *O. formosa* have been reported from Agromyzidae, Tephritidae, Drosophilidae and Buprestidae, while *S. nigricornis* was recorded from Apionidae on Fabaceae and Asteraceae (UCD Community, 2023). It is worth mentioning that there is no host plant for some species that have been reported from Iran, and we reported all of them for the first time on the common reed, *P. australis*. So far, there have been reports of the association of certain Chalcidoidea with plants of the Poaceae family in Iran (Fallahzadeh & Japoshvili, 2017; Saghaei et al., 2018). However, these studies appear to be inadequate, and our knowledge on this topic remains limited. Current research often focuses on restricted geographic areas. Expanding sampling to diverse habitats and employing varied collection methods, such as yellow pan traps or sweep nets, can enhance species diversity data and provide a more comprehensive understanding of Chalcidoidea populations associated with Poaceae.

We believe that the present study is an important effort in this direction, as it adds new records that expand knowledge of the biodiversity of Iran. It is also acknowledged that almost all the recorded species in this paper are potentially useful in biological control programs. Only *Tetramesa albomaculatum* is a phytophagous species that can be useful in the biological control of Poaceae (Lotfalizadeh et al., 2020b). Further taxonomic investigations, along with host association data, are necessary to increase the knowledge of the diversity and applicability of this group of chalcidoids in the Azarbaijan provinces and also other parts of Iran.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution to the paper as follows: S. Salimi: Fieldwork, sampling, and writing; Y. Karimpour: Fieldwork, writing and revising the manuscript; H. Lotfalizadeh: Identification of the chalcidoid specimens, and drafting. The authors read and approved the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the insect collection of the Hayk Mirzayans Insect Museum (HMIM), Iranian Institute of Plant Protection, Tehran, Iran, and are available from the curator, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included plants and arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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مجموعه زنبورهای بالاخانواده Chalcidoidea مرتبط با نی (*Phragmites australis*) در ایران

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چکیده: نمونه شاخه‌های نی (*Phragmites australis* (Cav.) Trin. ex Steud.) متعلق به تیره Poaceae طی سال‌های ۱۴۰۰ تا ۱۴۰۲ از نواحی جنوبی استان آذربایجان غربی جمع‌آوری شد. بافت‌های گیاهی جمع‌آوری شده به آزمایشگاه حشره‌شناسی دانشگاه ارومیه منتقل شد و زنبورهای متعلق به بالاخانواده Chalcidoidea پرورش داده شد. زنبورهای حاصل از پرورش، شامل ۱۱ گونه از ۱۰ جنس در شش خانواده بودند: گونه‌های *Eurytoma* *Tetramesa*, *Sycophila mellea* Curtis, 1831, *E. ochraceipes* Kalina, 1970, *crassinervis* Thomson, 1876 *Cerchysius subplanus* Dalman, 1894 *albomaculatum* Ashmead, 1820 و *Mayridia formosula* Mercet, 1921 از خانواده Encyrtidae؛ گونه‌های *Asaphes suspensus* Nees, 1834 *Sphegigaster* و *Homoporus arestor* Walker, 1848، *Halticoptera patellana* Dalman, 1818، *nigricornis* Nees, 1834 از خانواده Pteromalidae؛ گونه *Ormyrus orientalis* Walker, 1871 از خانواده Ormyridae و گونه *Oodera formosa* Giraud, 1863 از خانواده Ooderidae. از بین نمونه‌های شناسایی شده دو گونه شامل *E. crassinervis* و *T. albomaculatum* برای فون ایران جدید هستند.

واژگان کلیدی: نی، گزارش جدید، فهرست، پارازیتوئید، کنترل بیولوژیک، آذربایجان غربی