



## Additional evidence and new records of the subfamily Braconinae (Hymenoptera: Braconidae) in Western Iran

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**ABSTRACT.** A survey of Braconinae wasps was conducted at five sites, represented by various agroecosystems, rangelands and forests in Western Iran (Hamadan province) during 2015–2016 with a series of light and Malaise traps. Fifteen species belonging to three genera (*Bracon* Fabricius, *Glyptomorpha* Holmgren and *Pseudovipio* Szépligeti) were identified, among them five species, viz. *Bracon concavus* Tobias, *B. fumigidus* Szépligeti, *B. iskilipus* Beyarslan & Tobias, *B. moczari* Papp and *B. novus* Szépligeti, were recorded for the first time from Iran. 15 species are new provincial records for Hamadan.

**Key words:** *Bracon*, new records, Hamadan, Iran, fauna

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### Introduction

The Braconinae Nees is a large subfamily of moderately small to large wasps with more than 3000 species described worldwide (Yu et al., 2016). Most braconines are idiobiont ectoparasitoids of concealed Lepidoptera, Coleoptera, symphytan Hymenoptera and Diptera (Shaw & Huddleston, 1991).

In recent years, the fauna of some subfamilies of Iranian Braconidae is catalogued (Farahani et al., 2014a, 2014b, 2014c, 2015, 2016; Rajabi Mazhar et al., 2018; Abdoli et al., 2018) but Braconinae are

poorly studied (Ameri et al., 2014; Rahmani et al., 2017). Faunistic and taxonomic literature was summarized in the recent Iranian checklist (Farahani et al., 2016), which lists 11 genera and 115 species of Braconinae. Rahmani et al. (2017) have recorded eight new records of this subfamily from Iran.

The purpose of this study as a part of our ongoing research on braconid fauna of Iran is to contribute to the knowledge of the subfamily Braconinae in Western Iran.

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### Material and methods

Material for this study was collected by the first author from different habitats of Hamadan province in Western Iran during 2015–2016 using Malaise and light traps.

The material was collected in five locations (Fig. 1):

- Asadabad, Galehbor, 34°50'13.2" N, 48°10'14.0" E, 2150m a.s.l.
- Hamadan, Botanical Garden, 34°46'19.3" N, 48°30'55.6" E, 1950m a.s.l.
- Gonbad, 34°41'42.7" N, 48°42'05.2" E, 2220m a.s.l.
- Nahavand, Gian Forest, 34°09'53.3" N, 48°13'58.0" E, 1650m a.s.l.
- Toiserkan, Korzan, 34°35'22.4" N, 48°30'37.1" E, 1825m a.s.l.

Collected specimens were temporarily stored in 75% ethanol and afterwards cleaned according to the AXA method (van Achterberg, 2009) and mounted on triangular cards. The collected specimens were partly identified by comparison with type material by the second author

(marked as "KS" in the list) and using the keys provided by Quicke (1987) and Tobias (1995) and by comparison with the first part of the material (by the first author; marked as "AM" in the list). Specimens are deposited in the collection of the Research Department of Forests and Rangelands in Hamadan Research Center (FRHR) and in the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia (ZISP).

### Results

In the current study, 179 specimens of Braconinae were captured, of which 118 and 61 individuals were found in Malaise and light traps, respectively. Ten species have been collected by both traps. A total of 15 species have been identified, of which five species are new for the fauna of Iran: *Bracon concavus* Tobias, *B. fumigidus* Szépligeti, *B. iskilipus* Beyarslan & Tobias, *B. moczari* Papp and *B. novus* Szépligeti. New records are marked with an asterisk in the list.



**Figure 1.** Location of the Hamadan province in Iran and the sampling sites used in the current study.

***Bracon (Glabrobracon) bipartitus* Wesmael, 1838**

**Material examined:** Hamadan, Botanical Garden, Malaise trap (FRHR), leg.: A. Rajabi Mazhar: 25.VII.2015, 2♀♀, KS; AM: 25.IX.2015, 1♀; 15.VIII.2015, 1♀; 25.IX.2016, 1♀. Gonbad, AM (FRHR), leg.: A. Rajabi Mazhar: light trap, 30.VII.2016, 1♀; Malaise trap, 11.XI.2016, 1♀. Toiserkan, Korzan, Malaise trap, 10.VII.2016, 1♀, AM (FRHR), leg.: A. Rajabi Mazhar.

**Distribution in Iran:** Tehran, Qazvin (Zargar et al., 2015), North Khorasan, Kerman, Kermanshah (Rahmani et al., 2017), Hamadan (current study).

**General distribution:** Widely in Palaearctic (Yu et al., 2016).

***Bracon (Glabrobracon) chryso stigma* Greese, 1928**

**Material examined:** Asadabad, Galehbor, Malaise trap, 17.VI.2015, 1♀, KS (FRHR), leg.: A. Rajabi Mazhar. Gonbad, light trap, 25.VII.2016, 1♀, AM (FRHR), leg.: A. Rajabi Mazhar. Toiserkan, Korzan, Malaise trap, 10.VIII.2016, 1♀, 1♂, AM (FRHR), leg.: A. Rajabi Mazhar.

**Distribution in Iran:** Golestan (Ghahari & Fischer, 2011c), Hamadan (current study).

**General distribution:** Western Palaearctic (including Turkey, Israel and Iran) (Yu et al., 2016).

***Bracon (Lucobracon) concavus* Tobias, 1957 \***

**Material examined:** Asadabad, Galehbor, Malaise trap, leg.: A. Rajabi Mazhar: 08.VI.2015: 1♀, KS (ZISP); 1♂, AM (FRHR); 15.VI.2015, 1♀, AM (FRHR).

**Distribution in Iran:** Hamadan (current study).

**General distribution:** Turkey, Turkmenistan (Yu et al., 2016), new record from Iran.

***Bracon (Lucobracon) fumigidus* Szépligeti, 1901 \***

**Material examined:** Asadabad, Galehbor, Malaise trap (FRHR), leg.: A. Rajabi Mazhar: KS: 08.VI.2015, 1♀, 1♂; 01.IX.2015, 1♀; AM: 29.VI.2015, 1♂; 06.VII.2015, 2♀♀, 1♂; 27.VII.2015, 1♂; 23.IX.2015, 4♂; 10.VII.2016, 1♀; 25.IX.2016, 1♂. Hamadan, Botanical Garden, AM (FRHR), leg.: A. Rajabi Mazhar: light trap, 01.VIII.2016, 1♂; Malaise trap: 10.VII.2015, 1♀, 25.IX.2015, 1♀; 10.VII.2016, 2♀♀, 09.VIII.2016, 2♂♂. Gonbad, AM (FRHR): light trap, leg.: A. Rajabi Mazhar: 06.VII.2015, 2♂♂; 13.VII.2015, 1♀; 20.VII.2015, 1♂; 25.VII.2015, 1♂; 09.VIII.2015, 1♀; Malaise trap, 25.VIII.2015, 1♀. Nahavand, Gian Forest, leg.: A. Rajabi Mazhar: light trap, 26.VIII.2015, 1♀, AM (FRHR); Malaise trap: AM (FRHR): 29.VI.2015, 1♀; 26.VII.2015, 1♀, 1♂; 04.VIII.2015, 1♀; 17.VIII.2015, 1♂; KS (FRHR): 16.VIII.2016, 1♀; 18.X.2015, 2♂♂. Toiserkan, Korzan, Malaise trap, leg.: A. Rajabi Mazhar: AM (FRHR): 10.VII.2015, 1♂; 13.IX.2015, 1♂; 10.VII.2016, 1♀; KS (FRHR): 19.VII.2015, 1♀; 15.VIII.2015, 1♀; 13.IX.2015.

**Distribution in Iran:** Hamadan (current study).

**General distribution:** Western Palaearctic, Mongolia (Yu et al., 2016), new record from Iran.

***Bracon (Bracon) intercessor* Nees, 1834**

**Material examined:** Asadabad, Galehbor, Malaise trap, leg.: A. Rajabi Mazhar: AM (FRHR): 30.VI.2015, 1♂; 20.VII.2015, 1♂; 17.VIII.2015, 1♂, 1♀; 10.IX.2016, 1♂; KS (FRHR): 03.VII.2015, 1♀; 01.IX.2015, 1♂. Hamadan, Botanical Garden, leg.: A. Rajabi Mazhar: light trap, 25.VI.2015, 1♂, AM (FRHR); Malaise trap: AM (FRHR): 10.VI.2016, 1♀; 10.VII.2016, 1♂; 10.VIII.2016, 1♀; 10.VII.2016, 1♀, KS (FRHR). Nahavand, Gian Forest, leg.: A. Rajabi Mazhar: Malaise trap: 17.VI.2015, 1♀, KS (FRHR); AM

(FRHR): 26.VII.2015, 1♀; 26.VII.2015, 1♀; 10.VIII.2015, 1♀; 17.VIII.2015, 2♂; light trap AM (FRHR): 15.IX.2015, 1♂; 25.IX.2015, 1♂; 25.VII.2016, 1♂.

**Distribution in Iran:** Khorasan Razavi (Ghahari et al., 2009), Ilam (Ghahari et al., 2011a), Tehran (Ghahari et al., 2011c; Zargar et al., 2015), Semnan (Naderian et al., 2012), Lorestan (Ghahari et al., 2012a), Hormozgan (Ameri et al., 2014), Hamadan (current study).

**General distribution:** Common in Palaearctic (Yu et al., 2016).

***Bracon (Leucobracon) iskilius* Beyarslan & Tobias, 2008 \***

**Material examined:** Asadabad, Galehbor, Malaise trap, leg.: A. Rajabi Mazhar: AM (FRHR): 17.VI.2015, 1♂; 06.VII.2015, 2♀♀; 25.VII.2015, 1♀; 03.VIII.2015, 1♀, 2♂♂; 25.V.2016, 1♂; 25.VII.2016, 2♂♂, 1♀; 10.VIII.2016, 3♂♂, 2♀; 17.VIII.2015, 1♀, KS (ZISP). Gonbad, AM (FRHR), leg.: A. Rajabi Mazhar: light trap: 13.VII.2015, 2♂♂; 28.VII.2015, 1♂; 10.VIII.2015, 2♂♂; Malaise trap: 10.VIII.2015, 2♂♂. Nahavand, Gian Forest, leg.: A. Rajabi Mazhar: Malaise trap, 25.VII.2015, 1♀, KS (FRHR); light trap, AM (FRHR): 20.VII.2015, 1♂; 10.VIII.2015, 1♂; 07.IX.2015, 1♂. Toiserkan, Korzan, AM (FRHR), leg.: A. Rajabi Mazhar: light trap: 19.VII.2015, 1♂; Malaise trap: 10.VIII.2016, 2♀♀.

**Distribution in Iran:** Hamadan (current study).

**General distribution:** Turkey (Yu et al., 2016), new record from Iran.

***Bracon (Bracon) longicollis* Wesmael, 1838**

**Material examined:** Nahavand, Gian Forest, leg.: A. Rajabi Mazhar: light trap, AM (FRHR): 25.IX.2015, 1♀; 13.VII.2016, 1♀; Malaise trap, 10.VII.2016, 1♀, KS (FRHR).

**Distribution in Iran:** No specific locality cited (Tobias, 1995).

**General distribution:** Common in Palaearctic (Yu et al., 2016).

***Bracon (Osculobracon) minutus* Szépligeti, 1901**

**Material examined:** Asadabad, Galehbor, Malaise trap, 25.VII.2016, 1♀, AM (FRHR), leg.: A. Rajabi Mazhar. Hamadan, Botanical Garden, leg.: A. Rajabi Mazhar: Malaise trap, 29.V.2016, 2♀♀, KS (FRHR); AM (FRHR): 25.VI.2016, 1♀; 25.VII.2016, 1♀. Gonbad, AM (FRHR), leg.: A. Rajabi Mazhar: light trap, 25.VIII.2016, 1♀; Malaise trap: 20.IX.2015, 1♀; 27.IX.2015, 1♀; 25.VIII.2015, 2♀♀. Toiserkan, Korzan, Malaise trap, 10.VII.2016, 1♀, AM (FRHR), leg.: A. Rajabi Mazhar.

**Distribution in Iran:** Kermanshah (Rahmani et al., 2017), Hamadan (current study).

**General distribution:** Switzerland, Hungary, Turkey, Iran (Yu et al., 2016).

***Bracon (Lucobracon) moczari* Papp, 1969 \***

**Material examined:** Asadabad, Galehbor, leg.: A. Rajabi Mazhar: Malaise trap: AM (FRHR): 22.VI.2015, 1♀, 2♂♂; 29.VI.2015, 1♀, 3♂♂; 15.VII.2015, 2♂♂; 20.VII.2015, 1♀; 25.VII.2016, 2♀♀; 17.VIII.2015, 1♀; 23.VIII.2015, 1♂, 2♀♀; KS: 06.VII.2015, 2♀♀, (FRHR); 10.IX.2016, 1♂, 1♀, (ZISP). Hamadan, Botanical Garden, light trap, 29.V.2015, 1♂, AM (FRHR), leg.: A. Rajabi Mazhar. Gonbad (FRHR), leg.: A. Rajabi Mazhar: light trap: 17.VI.2015, 1♂, KS; 03.VII.2015, 1♂, AM; Malaise trap, 10.VIII.2015, 1♂, AM.

**Distribution in Iran:** Hamadan (current study).

**General distribution:** Greece, Hungary, Russia (Astrakhan Oblast), Turkey (Yu et al., 2016), new record from Iran.

***Bracon (Glabrobracon) novus* Szépligeti, 1901\***

**Material examined:** Nahavand, Gian Forest, Malaise trap (FRHR), leg.: A. Rajabi Mazhar:

09.VIII.2015, 1♀, KS; AM: 27.IX.2015, 1♀; 10.VIII.2016, 1♀; 10.IX.2016, 1♀.

**Distribution in Iran:** Hamadan (current study).

**General distribution:** Widely in Europe (Yu et al., 2016), new record from Iran.

***Bracon (Habrobracon) stabilis* Wesmael, 1838**

**Material examined:** Hamadan, Botanical Garden, leg.: A. Rajabi Mazhar: light trap, AM (FRHR): 10.VI.2016, 2♂♂; 25.VI.2016, 1♂. Gonbad, light trap (FRHR), leg.: A. Rajabi Mazhar: 13.VII.2015, 1♀, 1♂, KS; 10.VI.2016, 1♂, AM. Nahavand, Gian Forest, light trap (FRHR), leg.: A. Rajabi Mazhar: 09.VI.2016, 1♀, KS; AM: 25.VI.2016, 1♀, 1♂; 25.VIII.2016, 1♀. Toiserkan, Korzan, Malaise trap, 10.VI.2016, 1♀, AM (FRHR), leg.: A. Rajabi Mazhar.

**Distribution in Iran:** Qazvin (Ghahari et al., 2011b), Hamadan (current study).

**General distribution:** Common in Palaearctic (Yu et al., 2016).

***Bracon (Glabrobracon) tschitscherini* Kokujev, 1904**

**Material examined:** Asadabad, Galehbor (FRHR), leg.: A. Rajabi Mazhar: Malaise trap, AM: 23.VIII.2015, 1♀; 25.VII.2016, 1♀; 10.VIII.2016, 1♀; light trap, 06.VII.2016, 1♀, 1♂, KS. Nahavand, Gian Forest, light trap, 18.X.2015, 1♂, AM (FRHR), leg.: A. Rajabi Mazhar. Toiserkan, Korzan, Malaise trap, 10.VII.2015, 1♂, AM (FRHR), leg.: A. Rajabi Mazhar.

**Distribution in Iran:** West Azarbaijan (Ghahari & Fischer, 2011a), Golestan (Ghahari & Fischer, 2011b), Kordestan (Samin, 2015), Hamadan (current study).

**General distribution:** Western Palaearctic (including Kazakhstan and Central Asia) (Yu et al., 2016).

***Bracon (Glabrobracon) variator* Nees, 1811**

**Material examined:** Hamadan, Botanical Garden, Malaise trap, 25.VI.2016, 1♀, KS (FRHR), leg.: A. Rajabi Mazhar. Gonbad, light trap, 10.VIII.2016, 1♀, AM (FRHR), leg.: A. Rajabi Mazhar. Nahavand, Gian Forest, light trap, 07.IX.2015, 1♀, AM (FRHR), leg.: A. Rajabi Mazhar.

**Distribution in Iran:** Guilan (Ghahari & Fischer, 2011b), Hormozgan (Ameri et al., 2014), West Azarbaijan (Samin et al., 2014), Alborz, Qazvin, Tehran (Zargar et al., 2015), Hamadan (current study).

**General distribution:** Common in Palaearctic (Yu et al., 2016).

***Glyptomorpha pectoralis* (Brullé, 1832)**

**Material examined:** Toiserkan, Korzan, Malaise trap (FRHR), leg.: A. Rajabi Mazhar: 15.VIII.2015, 1♀, 1♂, KS; 10.VIII.2016, 1♀, AM.

**Distribution in Iran:** Kermanshah (Ghahari & Fischer, 2012), Guilan, Qazvin, Hormozgan (Zargar et al., 2014), Kerman, North Khorasan (Rahmani et al., 2017), Hamadan (current study).

**General distribution:** Common in Palaearctic and Oriental (Yu et al., 2016).

***Pseudovipio inscriptor* (Nees, 1834)**

**Material examined:** Asadabad, Galehbor, Malaise trap (FRHR), leg.: A. Rajabi Mazhar: 17.VI.2015, 1♀, KS; 17.VIII.2015, 1♀, AM (FRHR). Gonbad, Malaise trap, 22.VI.2015, 1♀, AM (FRHR), leg.: A. Rajabi Mazhar.

**Distribution in Iran:** Ilam (Ghahari et al., 2011a), Guilan (Ghahari et al., 2012b), Hormozgan, Qazvin (Zargar et al., 2014), Hamadan (current study).

**General distribution:** Common in Palaearctic (Yu et al., 2016).

**Discussion**

The majority of previous studies were conducted in the northwestern, northern, north-central, eastern and southern parts of

Iran (Zargar et al., 2014, 2015; Farahani et al., 2016; Rahmani et al., 2017). Few researches have been done on the fauna of Braconinae of the western part of Iran (Kermanshah, Ilam, Kordestan, Hamadan and Lorestan provinces), where about 47 species have been identified (Farahani et al., 2016; Rahmani et al., 2017), of which only 2 species (*B. trucidator* Marshall and *B. guttiger* Wesmael) have been previously found in Hamadan province.

It seems the both traps are necessary for collection of this group. *Bracon fumigidus* and *B. iskilipus* with 24.0% and 17.3%, respectively, had the highest abundance among the species.

The number of species of the subfamily Braconinae in the adjacent countries of Iran indicates the necessity of further investigations to get the true understanding about the diversity of this group.

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### Conflict of Interests

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

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## اطلاعات جدید از زیر خانواده Braconinae (Hymenoptera: Braconidae) در غرب ایران

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**چکیده:** این تحقیق با استفاده از تله‌های نوری و مالیز در پنج سایت مختلف شامل اکوسیستم‌های کشاورزی، مراتع و جنگل‌ها در غرب ایران (استان همدان) در سال‌های ۱۳۹۴-۱۳۹۵ انجام شد. ۱۵ گونه متعلق به سه جنس (*Bracon Fabricius*، *Glyptomorpha Holmgren* و *Pseudovipio Szépligeti*) شناسایی شد که در بین آنها پنج گونه شامل: *Bracon concauus* Tobias، *B. fumigidus*، *B. iskilipus* Beyarslan & Tobias، *B. moczari* Papp و *B. novus* Szépligeti برای اولین بار از ایران گزارش می‌شوند. همه ۱۵ گونه برای استان همدان گزارش جدید محسوب می‌شوند.

**واژگان کلیدی:** *Bracon*، گزارش‌های جدید، همدان، ایران، فون.