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A Study of the Rare Genus *Gnamptodon* Haliday (Hymenoptera: Braconidae: Gnamptodontinae) in Iran, with Three New Records

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ABSTRACT

A survey was conducted to study the species of Gnamptodontinae (Hymenoptera: Braconidae) in the northern provinces of Iran. The specimens were collected using Malaise traps from different habitats during 2010-2011. Four species of the genus *Gnamptodon* Haliday, 1833 were collected and identified, which of them three species *viz*., *Gnamptodon breviradialis* (Fischer, 1959), *G. decoris* (Förster, 1862) and *G. pumilio* (Nees, 1834) are recorded for the first time from Iran. Geographical distribution of the species is briefly discussed. A key is presented to the Iranian species.

Key words: Braconidae, Gnamptodontinae, *Gnamptodon*, new records, Iran.

INTRODUCTION

The Gnamptodontinae Fischer, 1970 is a small cosmopolitan subfamily of Braconidae (Hym.: Ichneumonoidea) with 87 described species worldwide (Yu *et al*., 2012). Gnamptodontines are characterized by presence of a transverse elevated area at the base of second metasomal tergite and absence of occipital and epicnemial carinae (van Achterberg, 1993). All species of Gnamptodontinae are solitary koinobiont endoparasitoids of the family Nepticulidae (Lepidoptera), especially of the genus *Stigmella* Schrank, 1802 (Shaw and Huddleston, 1991; Yu *et al.*, 2012). This subfamily contains five genera including *Gnamptodon* Haliday, 1833, *Gnaptogaster* Tobias, 1976, *Neognamptodon* Belokobylskij, 1999, *Pseudognaptodon* Fischer, 1965 and *Exodontiella* Wharton, 1977 (Yu *et al*., 2012). Only the first genus is represented in the west Palaearctic region (van Achterberg, 1983; Yu *et al*., 2012). According to Shenefelt and Marsh (1976), the genus *Liparophleps* Enderlein has been determined a junior synonym of *Semirhytus* Szépligeti and has been transferred to the subfamily of Doryctinae. Most of the described species belong to the genus *Gnamptodon* and are rarely longer than 1.5 mm.

World species of the subfamily Gnamptodontinae were revised and keyed by van Achterberg (1983), who described eleven new species for this taxon. Taxonomy of the genus *Gnamptodon* has already studied in China (Chen *et al.*, 2002), India

(Narendran and Rema, 1996; Ahmad, 2008), Russia and European part of USSR (Tobias, 1986; Belokobylskij, 1987), Korea (Papp, 2003), Australasian, Nearctic and Ethiopian regions (Fischer, 1965, 1987). The host-plant associations of the European species were discussed by van Achterberg (1984).

Only one species of the subfamily Gnamptodontinae, *Gnamptodon georginae* (van Achterberg, 1983) has been yet reported from Iran (Ghahari *et al.*, 2010). The aim of this research was to detect the occurrence of *Gnamptodon* species in the Northern provinces and to provide more data on the Gnamptodontinae species of Iran.

MATERIAL AND METHODS

Material for the present study was collected using Malaise traps with alcohol as a killing and preservation agent. Sampling was carried out from March to November during 2010- 2011 at five provinces in the north of Iran (Alborz, Tehran, Guilan, Mazandaran and Qazvin). The specimens were collected using 32 Malaise traps. They were placed in different habitats such as forests, pastures or orchards. Sampling procedures were similar for all localities. The specimens were extracted from Malaise traps and sorted weekly in 2010 and at bi-weekly intervals in 2011. Images for this study were taken with an Olympus ™ AX70 microscope and an Olympus™ SZX9 stereomicroscope equipped with a Sony CCD digital camera. Morphological terminology follows van Achterberg (1993). The collected specimens were identified using keys provided by van Achterberg (1983) and Tobias (1986). All specimens are deposited in the insect collection of the Department of Entomology, Tarbiat Modares University, Tehran, Iran.

RESULTS

Four species of the genus *Gnamptodon* Haliday were collected and identified including, *Gnamptodon breviradialis* (Fischer, 1959), *G. decoris* (Förster, 1862), *G. georginae* (van Achterberg, 1983) and *G. pumilio* (Nees, 1834). Of them three species are new records for the Iranian insect fauna which marked in the text by an asterisk.

**Gnamptodon breviradialis* (Fischer, 1959) (Fig. 1A)

Material examined: Iran, Guilan province, Roodsar, Rahimabad, Orkom (36°45′44.34″ N, 50°18′11.88″ E, 1201m a. s. l.), 15.VIII.2010, 1♀; 19.IX.2010, 1♀; 04.X.2010, 1♀; Mazandaran province, Noor, Chamestan, Gaznasara (36°16′58.08″ N, 52°10′55.62″ E, 2013 m a. s. l.), 25.IX.2011, 1♀; leg. M. Khayrandish.

Distribution: Former Czechoslovakia, France, France-main, Greece, Hungary, Italy, Moldova, Russia (Yu *et al.*, 2012) and Iran: Guilan and Mazandaran provinces (new record).

**Gnamptodon decoris* (Förster, 1862) (Fig. 1B)

Material examined: Iran, Guilan province, Astaneh Ashrafiyeh, Eshman kamachal (37°22′03.66″ N, 49°57′57.84″ E, -1m b. s. l.), 23.V.2010, 1♀; 13.VI.2010, 1♀; 10.VII.2010, 1♀; 15.VIII.2010, 1♂; 28.VIII.2010, 1♀, 1♂; 04.IX.2010, 1♀; 12.IX.2010, 1♀; Mazandaran province, Noor, Chamestan, Joorband (36°26′15.54″ N, 52°07′13.50″ E, 275m a. s. l.), 09.X.2011, 1♀; Tangehvaz (36°21′55.02″ N, 52°06′10.74″ E, 692m a. s. l.), 15.VIII.2011, 1♀, leg. A. Mohammadi.

Distribution: Austria, Bulgaria, former Czechoslovakia, Finland, Germany, Greece, Hungary, Italy, Kazakhstan, Korea, Kyrgyzstan, Moldova, Mongolia, The Netherlands, Poland, Russia, Switzerland, Ukraine, United Kingdom (Yu *et al.*, 2012) and Iran: Guilan and Mazandaran provinces (new record).

Gnamptodon georginae (van Achterberg, 1983) (Fig. 1C)

Material examined: Iran, Alborz province, Karaj (35°46′08.88″ N, 50°56′55.20″ E, 1277m a. s. l.), 17.V.2010, 1♂; 31.V.2010, 1♀; 07.VI.2010, 1♀; 14.VI.2010, 1♀, 1♂; 21.VI.2010, 1♀; 20.IX.2010, 1♂; 27.IX.2010, 1♀; Guilan province, Roodsar, Rahimabad, Ziaz (36°52′27.18″ N, 50°13′24.78″ E, 490m a. s. l.), 28.VIII.2010, 1♀; 12.IX.2010, 1♀; Qazvin province, Zereshk Road (36°25′23.88″ N, 50°06′37.68″ E, 1926m a. s. l.), 26.VII.2011, 1♂; 16.VIII.2011, 2♀♀; 03.IX.2011, 1♀; Tehran province, Shahriar (35°40′08.10″ N, 50°56′56.64″ E, 1168m a. s. l.), 24.V.2010, 1♀; 14.VI.2010, 1♀; 06.IX.2010, 1♀; 18.X.2010, 1♀; leg. M. Khayrandish.

Distribution: Algeria, Bulgaria, China, Germany, Italy, Moldova, Poland, Russia, Switzerland, Ukraine (Yu *et al.*, 2012) and Iran: Golestan province (Ghahari *et al.*, 2010), Alborz, Guilan, Qazvin and Tehran provinces (this study).

**Gnamptodon pumilio* (Nees, 1834) (Fig. 1D)

Material examined: Iran, Guilan province, Roodsar, Rahimabad, Orkom (36°45′44.34″ N, 50°18′11.88″ E, 1201m a. s. l.), 12.IX.2010, 1♀; 19.IX.2010, 1♀; Mazandaran province, Noor, Chamestan, Gaznasara (36°16′56.82″ N, 52°10′58.50″ E, 2032 m a. s. l.), 26.V.2011, 1♂, leg. A. Nadimi.

Distribution: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Korea, Lithuania, Moldova, The Netherlands, Norway, Poland, Russia, Slovakia, Sweden, Switzerland, Ukraine, United Kingdom (Yu *et al.*, 2012) and Iran: Guilan and Mazandaran provinces (new record).

Key to the species of *Gnamptodon* known from Iran

1. Vein r of forewing equal or longer than vein 3-SR (Fig. 2A); distance between apex of marginal cell and tip of wing 3.5 times as long as vein 1-R1 in forewing (Fig. 2A); vertex smooth and shiny; anterolateral grooves of the tergite 3 rather deep (Fig. 3A) ..... *G. breviradialis* Fischer

- Vein r of forewing distinctly shorter than vein 3-SR (Figs. 2B-D); distance between apex of marginal cell and tip of wing 0.5-1.5 times as long as vein 1-R1 in forewing (Figs. 2B-D); vertex with coriaceous sculpture and matt; anterolateral grooves of the tergite 3 absent (Fig. 3B) 2

2. Marginal cell of forewing large, distance between apex of marginal cell and tip of wing 0.5 times as long as vein 1-R1 in forewing (Fig. 2D); vein SR-1 of forewing distinctly straight (Fig. 2D) ..... *G. pumilio* (Nees)

- Marginal cell of forewing small, distance between apex of marginal cell and tip of wing 1.2-1.5 times as long as vein 1-R1 in forewing (Figs. 2B-C); vein SR-1 of forewing sinuate (Figs. 2B-C) 3

3. Four basal antennal segments of female yellow; first three metasomal tergites yellow (Fig. 1C) with distinct basal elevation on second tergite (Fig. 3B); antenna of female 18-20-segmented ..... *G. georginae* van Achterberg

- Four basal antennal segments of female usually dark brown dorsally; metasoma uniformly black (Fig. 1B), if first three metasomal tergites yellow then basal elevation of second tergite indistinct medially; antenna of female 20-22-segmented .... *G. decoris* (Foerster)

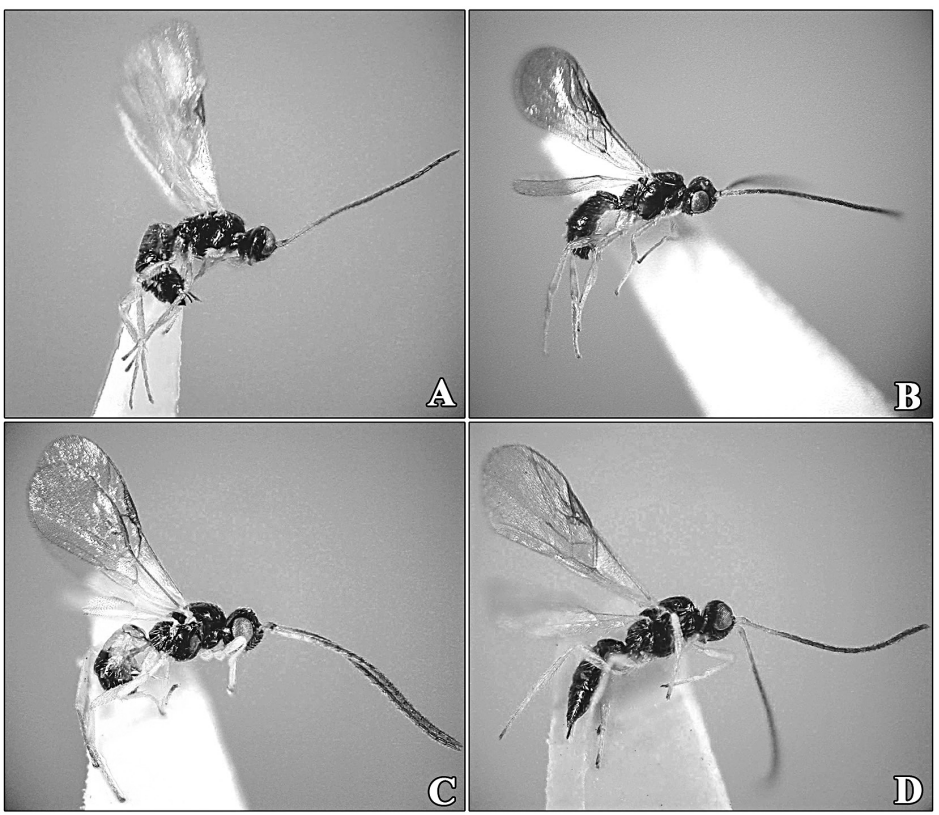

Fig. 1. Lateral view of adult females of *Gnamptodon* species: A) *G. breviradialis*, B) *G. decoris*, C) *G. georginae*, D) *G. pumilio*.

DISCUSSION

In this study, we were collected 35 specimens of Gnamptodontinae during two years from the north of Iran, while Chen *et al.* (2002) noted that they found only five specimens (belonging to two species) of Gnamptodontinae from the collections in China. It seems the Malaise traps are an appropriate sampling method for collection of this group. Species of the genus *Gnamptodon* are rarely collected group (van Achterberg, 1993; Chen *et al.*, 2002).

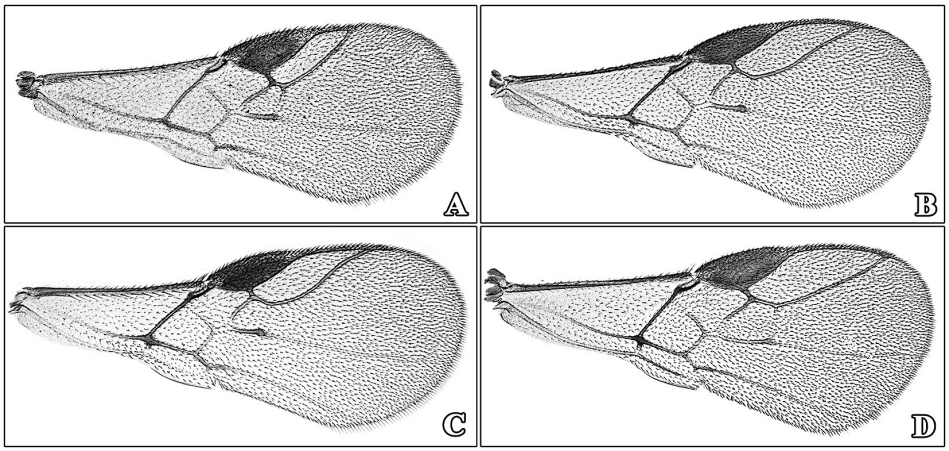

Fig. 2. Fore wing of *Gnamptodon* species: A) *G. breviradialis*, B) *G. decoris*, C) *G. georginae*, D) *G. pumilio*.

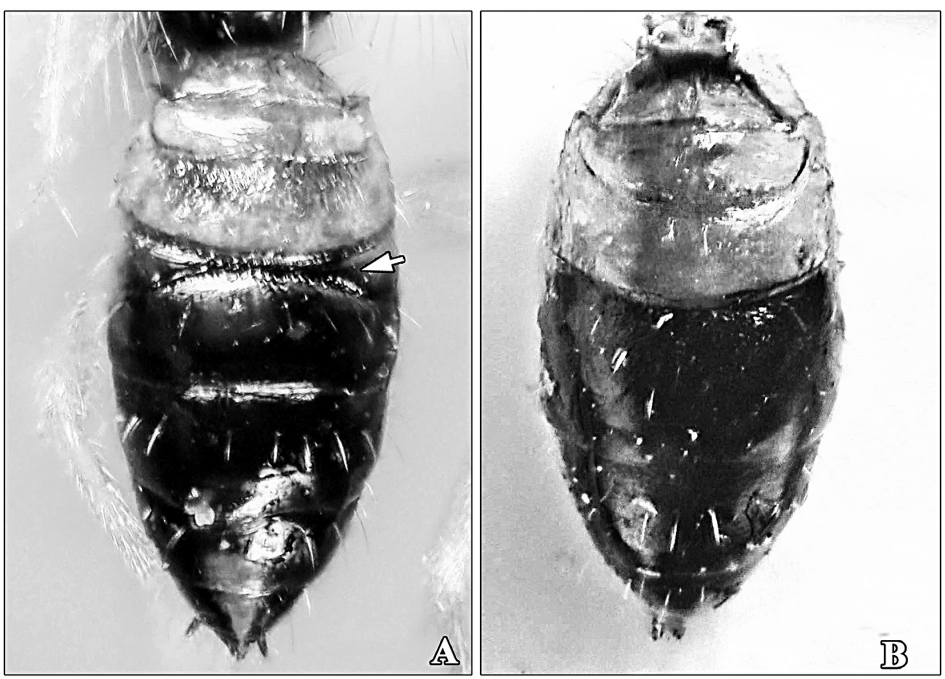

Fig. 3. Dorsal view of the abdomen of *Gnamptodon* species: A) *G. breviradialis*, B) *G. georginae*.

Among the neighboring countries, Tobias (1986) and Belokoblyskij (1987) reported seven species of *Gnamptodon* from Russia, while Tobias and Saidov (1997) recorded only one species (*G. tadzhicus*) from Tajikistan. Despite of the recent extensive surveys on the rare braconids in Turkey (Beyarslan, 2009; Beyarslan and Aydogdu, 2013), no

species of Gnamptodontinae is detected. This is may be due to different collection methods (light trap and sweeping net) or the habitat structure and climate conditions.

According to our research, four species including the previously recorded species of *Gnamptodon* are detected in the Northern part of Iran. There are no records of Gnamptodontinae from other regions of the country. The first species of *Gnamptodon* (*G. georginae*) was reported from cotton field of Golestan province by Ghahari *et al.* (2010). The Alborz Mountains separate the tropical Caspian Sea area (Guilan and Mazandaran provinces) from Alborz and Tehran provinces. Our study showed that three species (*G. breviradialis*, *G. decoris* and *G. pumilio*) have been collected only from Guilan and Mazandaran provinces (northern slopes of Alborz Mountains), while *G. georginae* distributed in the all studied area (northern and southern slopes of Alborz Mountains). Iran is a large country, incorporating various geographical regions and climates and it would be expected that still part of *Gnamptodon* species from Iran remain to be discovered.

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