

SHORT COMMUNICATION

***Venanides caspius* sp. nov. from Iran, the first species of *Venanides* (Hymenoptera: Braconidae) described from the Palaearctic Region**

Parisa ABDOLI¹⁾, Ali Asghar TALEBI^{1,4)}, Samira FARAHANI²⁾ & Jose FERNANDEZ-TRIANA³⁾

¹⁾ Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran;
e-mail: p.abdoli@modares.ac.ir; talebia@modares.ac.ir.

²⁾ Research Institute of Forests and Rangelands, Agricultural Research Education and Extension Organization (AREEO), Tehran, I. R. Iran;
e-mail: s.farahani@rifr-ac.ir

³⁾ Canadian National Collection of Insects, Ottawa, Canada; e-mail: Jose.Fernandez@agr.gc.ca

⁴⁾ corresponding author

Accepted:
2nd December 2019

Published online:
27th December 2019

Abstract. The genus *Venanides* Mason, 1981 (Hymenoptera: Braconidae: Microgastrinae) is recorded from Iran for the first time, and a new species, *Venanides caspius* Abdoli, Fernandez-Triana & Talebi sp. nov., is described and illustrated. This new species is characterized by its long metasomal tergite 1, that is narrowing towards the posterior end; scutoscuteellar sulcus very narrow, obliterated or weakly crenulate; wing veins pale or almost transparent. The newly described taxon is the first representative of *Venanides* in the Palaearctic Region identified to the species level.

Key words. Hymenoptera, Braconidae, Microgastrinae, *Venanides*, fauna, taxonomy, Iran, Palaearctic Region

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Introduction

Braconidae is the second largest family of Ichneumonoidea (Hymenoptera) (AGUIAR et al. 2013) with more than 21,220 species described worldwide (YU et al. 2016, WHITFIELD et al. 2018). The braconid subfamily Microgastrinae, with 2,710 known species (RODRIGUEZ et al. 2013, YU et al. 2016, WHITFIELD et al. 2018) is one of the largest groups of parasitoids in terms of species richness and economic importance (RODRIGUEZ et al. 2013, QUICKE 2015). *Venanides* Mason, 1981 is a small genus of microgastrine parasitoid wasps that currently contains ten species from the Afrotropical, Australasian, Nearctic, Neotropical, and Oriental Regions (MASON 1981, YU et al. 2016, FERNÁNDEZ-TRIANA & VAN ACHTERBERG 2017). Concerning the distribution of *Venanides* in the Palaearctic Region, SHAW (2012) indicated that two specimens deposited in the National Museum of Scotland which were collected in Tenerife (Canary Islands) belonged to the genus *Venanides*, but neither specimen had been identified to the species level.

Species that are currently included in *Venanides* were initially described in the genus *Apanteles* Foerster, 1862

(DE SAEGER 1941). Subsequently, some species were treated as one species-group (*A. congoensis*-group) of *Apanteles* sensu lato (NIXON 1965). MASON (1981) reclassified Microgastrinae and described *Venanides* as a new genus to accommodate the species of the *A. congoensis*-group of NIXON (1965).

It should be noted that YU et al. (2016) did not consider *Venanides* to be an independent genus and transferred *Venanides*, *Nyereria* Mason, 1981, *Rasivalva* Mason, 1981, *Sathon* Mason, 1981, and *Distatrix* Mason, 1981 as subgenera of *Protapanteles* Ashmead, 1898, proposed by VAN ACHTERBERG (2002). However, that decision has not been universally accepted (e.g. ROUSSEI & GUPTA 2013, FERNÁNDEZ-TRIANA & VAN ACHTERBERG 2017, WHITFIELD et al. 2018).

The species of the genus *Venanides* have been recorded mostly as gregarious parasitoids on the following Lepidopteran hosts: *Agonoxena pyrogramma* Meyrick, 1924 (Agonoxenidae), *Archips* sp. (Tortricidae), *Plecoptera reflexa* Guenee, 1852 (Noctuidae), *Chionodes formosella* (Murtfeldt, 1881), *Dichomeris flavocostella* (Clemens, 1860) (Gelechiidae). SHAW (2012) recorded two specimens



of the genus *Venanides* that he reared from *Brachmia convolvuli* Walsingham, 1907 and *Teleiopsis lunariella* (Walsingham, 1908) (Lepidoptera: Gelechiidae). Both species appear to be solitary, which may be unusual for *Venanides* (SHAW 2012).

In recent years, the fauna of some subfamilies of the Iranian Braconidae have been catalogued (e.g., FARAHANI et al. 2016), but the Microgastrinae have been poorly studied (FARAHANI et al. 2014; GADALLAH et al. 2015; GHAFOURI MOGHADDAM et al. 2018; ABDOLI et al. 2019a,b; ZARGAR et al. 2019a,b). The objective of this study is to improve our knowledge of the Microgastrinae in Iran and the description of the first Palearctic *Venanides* identified to the species level.

Material and methods

The sampling for the present study was done using Malaise traps from March to November 2010 and 2011 in northern Iran (i.e., Alborz, Guilan, Mazandaran, Qazvin, and Tehran provinces) between -14 and 2305 m a.s.l. However, specimens of the genus *Venanides* were found only in one Malaise trap which was installed in Guilan province. The specimens were identified using GRANGER (1949), NIXON (1965), MASON (1981), and FERNANDEZ-TRIANA & VAN ACHTERBERGE (2017) and also by examining specimens deposited in the Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada (i.e., *V. congoensis* (de Saeger, 1941), *V. flavus* Fernandez-Triana & van Achterberg, 2017, *V. tenuitergatus* Fernandez-Triana & van Achterberg, 2017, *V. vanharteni* Fernandez-Triana & van Achterberg, 2017, and *V. xeste* Mason, 1981).

The specimens were photographed with a Keyence VHX-1000 Digital microscope, using a lens with a range of 13.0–130.0×. Multiple images of a structure were taken through the focal plane and these were combined to produce a single in-focus image, using the software associated with the Keyence system.

The measurements were done using an Olympus™ SZX9 stereomicroscope equipped with a graticule. Measurement of the obtuse angle in T2 is based on the angle between lateral grooves of T2 and its basal width. Morphological terminology follows WHARTON et al. (1997) for wings venation, and KARLSSON & RONQUIST (2012) for the other body parts used in description of the new species. The abbreviations T1, T2 and T3 mean tergites 1, 2, and 3, respectively. T4+ means T4 to end of metasoma. The type specimens are deposited in the Insect Collection of the Department of Entomology, Tarbiat Modares University, Tehran, Iran (TMUC) and one male paratype in the Canadian National Collection of Insects, Arachnids and Nematodes, Agriculture and Agri-food Canada (CNC).

Results

In the current study, the genus *Venanides* is recorded from Iran for the first time, and a new species, *Venanides caspicus* Abdoli, Fernandez-Triana & Talebi sp. nov., is described and illustrated. This is the first species of the genus *Venanides* described from the Palearctic Region.

Venanides Mason, 1981

Type species. *Venanides xeste* Mason, 1981: 101, holotype: ♀, Canada, Ontario, Cimcoe, reared from *Dicohmeris ligulella* Hbn. (CNC: No. 15755).

Diagnostic characters. Members of *Venanides* are diagnosed by having short and evenly sclerotized hypopygium; ovipositor sheaths short, smooth, and bearing minute setae near apex (or sheaths apparently without any visible setae); T1 usually evenly narrowing towards posterior end but sometimes parallel-sided, T1 length 2.5× its posterior width; T1 surface smooth or almost so; T2 with a partial or complete subtriangular area that is about as long as wide at posterior end and is laterally marked by grooves that diverge at an angle of less than 100°; propodeum almost smooth; anteromesoscutum and mesoscutellar disc shiny, weakly punctate, together forming an evenly flattened surface; antenna of female short and thick, the flagellomeres with a single row of placodes; legs short and stout, especially femora; upper outer surface of metacoxa usually flat, shiny, and impunctate; vannal lobe straight (MASON 1981).

Venanides caspicus

Abdoli, Fernandez-Triana & Talebi sp. nov.

(Figs 1–9)

Type material. HOLOTYPE: ♀, "Iran: Guilan province / Astaneh Ashrafiyeh, Eshman kamachal / alt. 2 m / N:37°21.16', E:49°57.93' / 09.V.2010 / M. Khayrandish leg." [a card with locality data and collector in English script, printed]; mounted on a triangular card (TMUC). PARATYPES: 1 ♀ and 4 ♂♂ (TMUC), 1 ♂ (CNC), same data as holotype.

Diagnosis. T1 long and evenly narrowing from anterior to posterior end; scutoscuteellar sulcus very narrow, almost obliterated or weakly crenulate (Fig. 4); wing veins pale or almost transparent (Figs 8–9); head in frontal view without enlarged upper face (upper face slightly higher than lower face), head width 1.3× its height; metasoma dark brown; metafemur brown.

Description. *Female* (holotype). Body length 2.0 mm, antenna length 1.4 mm, fore wing length 2.0 mm.

Head. Antennae relatively short, not reaching beyond T2, and with single row of placodes; flagellomeres with scattered setae; scape longer than first flagellomere; length of 15th flagellomere 1.5× its width; length of 16th flagellomere 2.0× or slightly more than its width (Fig. 1); antennal scrobe large, shallow and broadening, closed to eyes; in dorsal view, head width 1.8× its length, head (along with eyes) with dense long setae (Fig. 2); head in frontal view without enlarged upper face (upper face slightly higher than lower face), head width 1.3× its height; lower face width 1.4× its height, smooth and shining, setose; clypeus width 3.5× its height; mouthpart with long setae (Fig. 3).

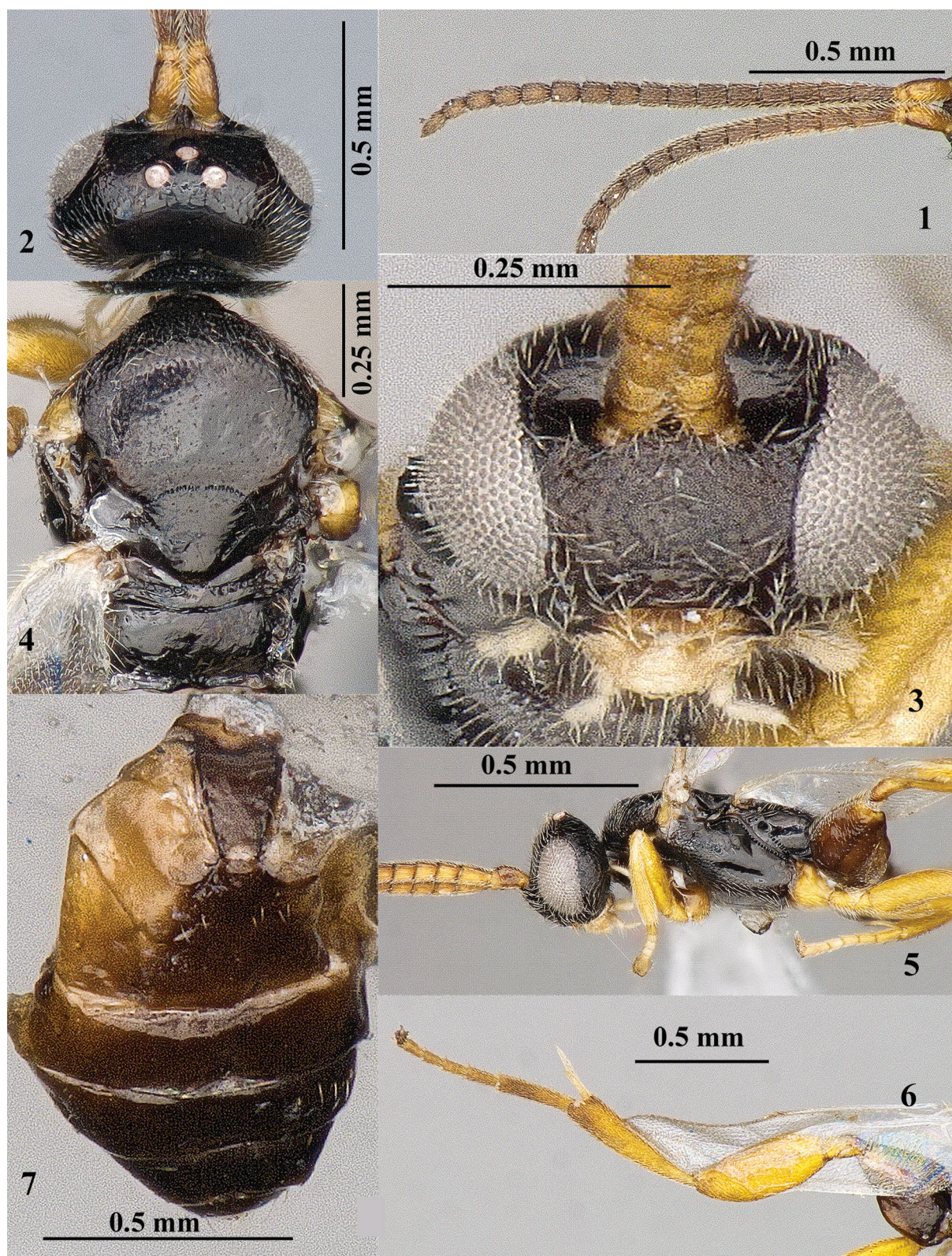
Mesosoma. Strongly depressed, anteromesoscutum, mesoscutellar disc and propodeum almost in the same plane; anteromesoscutum almost smooth and shiny with fine punctures anteriorly and laterally, anteromesoscutum with disperse setae (median region less setose); notauli not defined; mesoscutellar disc smooth and less setose; scutoscuteellar sulcus with narrow crenulation; propodeum almost smooth, with a few setae laterally and posteriorly

(Fig. 4); pronotum smooth; mesopleuron in anterior half faintly punctate and setose (Fig. 5).

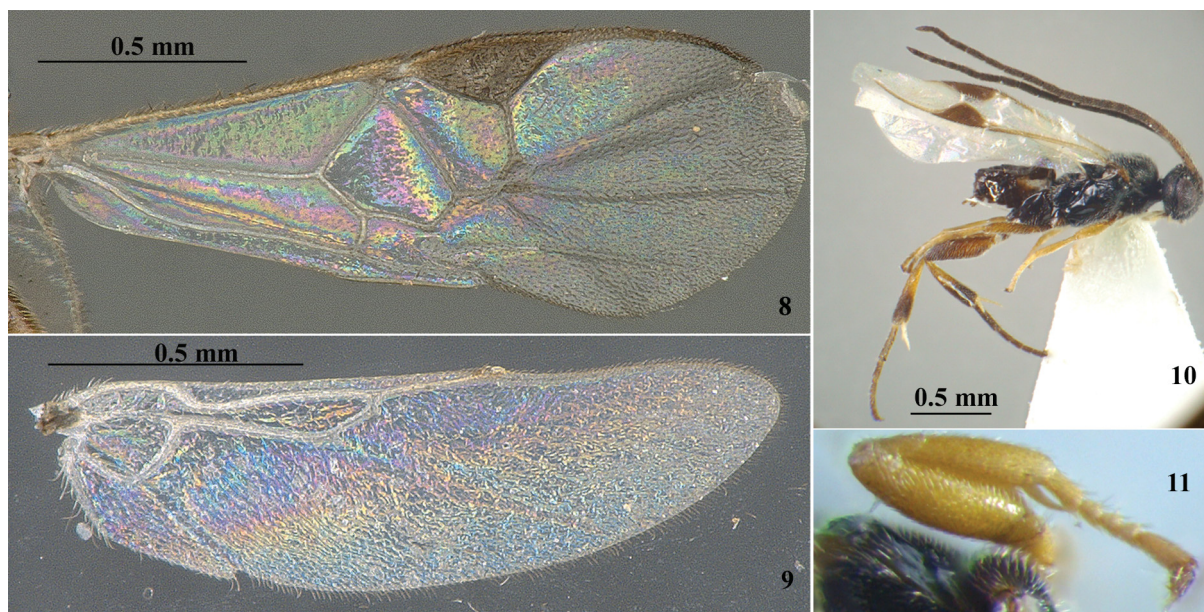
Wings. Fore wing areolet absent; wing surface with setae except for around veins M+CU1 and 1+1A less setose; pterostigma length $2.4\times$ its width; discal cell length $1.3\times$ its width, 1CUb vein $1.4\times$ as long as 1CUa vein; R1

vein longer than pterostigma; r vein long, slightly shorter than pterostigma width (Fig. 8); hind wing: vannal lobe flattened subapically, setae sparse or absent over flattened part of margin (Fig. 9).

Legs. Protarsus short, probasitarsus as long as sum of second and third segments, fifth segment as long as sum



Figs 1–7. *Venanides caspicus* sp. nov., female: 1 – antenna; 2 – head, dorsal view; 3 – face; 4 – mesosoma, dorsal view; 5 – head and mesosoma, lateral view; 6 – hind leg; 7 – metasoma, dorsal view.



Figs 8–11. *Venanides caspicus* sp. nov.: 8 – female, fore wing; 9 – female, hind wing; 10 – male, habitus; 11 – female, fore leg.

of segments two to four; fifth segment of protarsus without modified seta projecting opposite to indentation (Fig. 11); metacoxa large, depressed, smooth and shining, metacoxal length $1.5\times$ its maximum width and metafemur length $2.5\times$ its width; metafemur as long as metatibia; inner metatibial spur thick and longer than half of metabasitarsus; metabasitarsus as long as sum of segments two to four (Fig. 6).

Metasoma. All terga polished; T1 gradually narrowing toward posterior end, smooth; T1 length $2.5\times$ its basal width and $5.5\times$ its posterior width; T2 with triangular median field, T2 width $1.5\times$ its median length; suture between T2 and T3 poorly defined and somewhat concave, T3 $1.5\times$ as long as T2; T3 width $2.0\times$ its median length (Fig. 7); hypopygium short and sclerotized; ovipositor short, less than $1.3\times$ as long as metatibia; ovipositor sheaths apparently without setae.

Colouration. Body black, with the exception of yellowish-brown antenna; face, clypeus and tergum blackish brown; mouthparts reddish- or whitish-yellow; tegula yellow; wings hyaline, fore wing venation whitish-yellow, pterostigma without pale spot basally (Fig. 8); hind wing venation transparent; legs (except of brown metacoxa) yellow to reddish-yellow.

Male (Fig. 10). All characters similar to female, with the exception of its darker colouration; antenna longer than body with two rows of placodes, scape shorter than first flagellomere, length of 15th flagellomere $2.9\times$ its median width; metafemur thinner, length/width ratio 3.0; inner metatibial spur less thick.

Differential diagnosis. *Venanides caspicus* sp. nov. seems to be closest to *V. flavus* Fernández-Triana & van Achterberg, 2017 that has recently been reported from Yemen (FERNÁNDEZ-TRIANA & VAN ACHTERBERG 2017). In both species T2, T3 and posterior half of metasoma are entirely dark brown, but they can be separated as follows:

1. T1 almost parallel sided and rounded towards posterior margin; scutoscuteellar sulcus with well-defined crenulae; wing veins brown.
.... *V. flavus* Fernández-Triana & van Achterberg, 2017
- T1 long and narrowing towards posterior margin; scutoscuteellar sulcus very narrow, obliterated or weakly crenulate (Fig. 4); wing veins pale or almost transparent (Figs 7–8). *V. caspicus* sp. nov.

Etymology. The new species is named after its type locality. The species name, *caspicus*, is an adjective derived from the Caspian Sea in the north of Iran.

Habitat. The habitat of the type series consisted mainly of mixed humid forests ranging from coniferous to deciduous trees in coastal areas of the Caspian Sea in northern Iran.

Distribution. Northern Iran: Guilan Province.

Discussion

In the present study, we treat *Venanides* as a separate genus that can be distinguished from the most similar genus, *Glyptapanteles* Ashmead, 1904, by the following characters: pronotum laterally with a single furrow or sulcus (with two furrows or sulci in *Glyptapanteles*); female with short and thick antennae, flagellomeres with a single row of placodes, and legs, especially femora, which are short and stout (female with normal size antennae, flagellomeres with two rows of placodes, and legs (especially femora) with normal length and width in *Glyptapanteles*).

Previous studies revealed that *Venanides* is a small genus with 10 species described worldwide (DE SAEGER 1941, GRANGER 1949, NIXON 1965, MASON 1981, FERNÁNDEZ-TRIANA & VAN ACHTERBERG 2017). Including our finding, the number of species has now increased to eleven (Table 1). The region sampled in the present study belongs to the Irano-Anatolian hotspot, consisting of many centers of

Table 1. An updated world list of the genus *Venanides* Mason, 1981 (Hymenoptera: Braconidae) along with their distribution and references.

Species	Distribution	References
<i>Venanides caspicus</i> sp. nov.	Palearctic: Iran	Current study
<i>Venanides congoensis</i> (de Saeger, 1941)	Afrotropical: D.R.Congo, Uganda, Cameroon	DE SAEGER (1941)
<i>Venanides curticornis</i> (Granger, 1949)	Afrotropical: Madagascar, Reunion Island	GRANGER (1949)
<i>Venanides flavus</i> Fernández-Triana & van Achterberg, 2017	Afrotropical: Yemen	FERNANDEZ-TRIANA & VAN ACHTERBERG (2017)
<i>Venanides longifrons</i> Fernández-Triana & van Achterberg, 2017	Afrotropical: Yemen	FERNANDEZ-TRIANA & VAN ACHTERBERG (2017)
<i>Venanides plancina</i> (Nixon, 1965)	Oriental: India, China	NIXON (1965)
<i>Venanides pyrogrammae</i> (Nixon, 1965)	Australasian: Papua New Guinea, Australia	NIXON (1965)
<i>Venanides supracompessus</i> Fernández-Triana & van Achterberg, 2017	Afrotropical: Yemen	FERNANDEZ-TRIANA & VAN ACHTERBERG (2017)
<i>Venanides tenuitergitus</i> Fernández-Triana & van Achterberg, 2017	Afrotropical: Yemen	FERNANDEZ-TRIANA & VAN ACHTERBERG (2017)
<i>Venanides vanharteni</i> Fernández-Triana & van Achterberg, 2017	Afrotropical: Yemen	FERNANDEZ-TRIANA & VAN ACHTERBERG (2017)
<i>Venanides xeste</i> Mason, 1981	Nearctic: Canada, USA; Neotropical: Brazil	MASON (1981)

local endemism (KIANI et al. 2017), and previous studies showed that this region contains the highest biodiversity of braconid wasps in Iran (FARAHANI et al. 2014, 2016; ABDOLI et al. 2019a,b). Contrary to these results, only a few specimens of *Venanides* were collected recently only from Guilan province, and no samples were found from Alborz, Qazvin, Mazandaran and Tehran provinces, however Malaise traps were placed in different habitats such as forests, rangelands and orchards in the north of Iran, for two consecutive years, in 2010 and 2011. Our finding showed that the genus *Venanides* is relatively rare with a restricted distribution in northern Iran. Nevertheless, Iran is a large country with high climatic heterogeneity, located at the crossroads of three zoogeographical realms, the Palearctic, Afrotropical, and the Oriental (KIANI et al. 2017). Recently, FERNANDEZ-TRIANA & VAN ACHTERBERG (2017) reported five new species of *Venanides* from Yemen. Accordingly, further faunistic surveys in the same climatic zone, especially in southern areas of Iran, may find new records and taxa. Previous studies on the fauna of Hymenoptera in southern Iran showed that some species are distributed in both southern Iran and the Arabian Peninsula (for example, FARHAD et al. 2015, 2017), and their distributions suggest some species can disperse in two zoogeographical regions.

Acknowledgements

Thanks are due to the Department of Entomology, Tarbiat Modares University for providing financial support for this study and also to the Canadian National Collection (CNC) of Insects, Arachnids and Nematodes in Agriculture and Agri-food Canada for providing facilities. Many thanks to Drs. M. Khayrandish, A. Nadimi and A. Mohammadi for helping us collect the specimens. We cordially thank Dr. Petr Kment (the editor of *Acta Entomologica Musei Nationalis Pragae*), Dr. José Vicente Falcó Garí (Instituto Cavanilles de Biodiversidad y Biología Evolutiva, Universidad de Valencia, Spain) and an anonymous reviewer for

their critical reviews and constructive comments which significantly improved the paper.

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