

## A new species of *Conomorium* Masi, 1924 from sugarcane fields in the southwest of Iran

(Hymenoptera, Pteromalidae)

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A new species of parasitoid wasps is described as *Conomorium iranum* sp. nov. (Hymenoptera: Pteromalidae) from southwest Iran. Material of this species was collected from the pupae of *Sesamia cretica* Lederer, 1857, and *S. nonagrioides* (Lefebvre, 1827) (Lepidoptera: Noctuidae). Also, a differential diagnosis of the new species is given.

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### Introduction

Wasps of the family Pteromalidae (Hymenoptera) are distributed in all zoogeographic regions of the world and parasitize different species of Lepidoptera, Diptera, Coleoptera, Hymenoptera, Hemiptera, and Arachnida. This family is one of the most diverse families of parasitic Hymenoptera. Prior to the study of Burks et al. (2022), 33 subfamilies of Pteromalidae, including 640 genera, were recognized. Burks et al. (2022), according to both molecular and morphological evidence, split Pteromalidae into 24 families, leaving Pteromalidae with 8 subfamilies that include 414 genera (Noyes 2019, Burks et al. 2022). Due to their significant role as a group of natural enemies of agricultural pests, Pteromalidae are an economically important insect taxon. Their biology and host associations vary widely, but most species are idiobionts and develop as ectoparasitoids or endoparasitoids of larvae and pupae. Some pteromalids are also predatory rather than parasitoid, and some species are even phytophagous (Bouček 1988, Goulet & Huber 1993).

The genus *Conomorium* (Chalcidoidea: Pteromalidae) was first described and distinguished from the genera *Coelopisthia* Förster, 1856; *Psychophagus* Mayr, 1904; and *Arthrolysis* Förster, 1856, by Masi a century ago (1924). After that, Graham (1969, 1992) described some European species and revised the genus. Subsequently, Bouček (1993), Xiao & Huang (2000), Yang & Baur (2004), and Doğanlar (2020) added new species to this genus. So far, 13 species of this genus have been described, only two of which, *C. patulum* (Walker, 1835) (Nikdel et al. 2006) and *C. ampulum* Walker, 1835 (Nazemi-Rafie et al. 2011), are observed in Iran. Also, Cheraghi & Esfandiari (2018) reported a wasp belonging to the genus *Conomorium* on sugarcane stem borer, *Sesamia cretica* Lederer, 1857, in Iran without determination of the species. The distribution of the genus is mainly in the Palearctic region, however, it is also reported from the Afrotropical and Oriental regions. All reported species of this genus are pupal parasitoids of Lepidoptera (Noyes 2019).

The genus *Conomorium* Masi, 1924 is recognized by the following characteristics: Body metallic dark; antennal insertion on the lower margin of eyes; first funicular segment conic-like, distinctly longer than broad and longer than second; lower face slightly protuberance, gena not hollowed; occiput not margined. Thorax convex; pronotum with distinct collar and collum; collar not margined. Forewing without marginal fringe; marginal vein less than 1.5 times as long as the stigmal; postmarginal vein at most equal to stigma vein. Hind femur with one spur. Gaster circular or subcircular. All species of this genus are gregarious parasites in pupae of various Lepidoptera (Xiao & Huang 2000, Yang & Baur 2004, Nikdel et al. 2006, Doğanlar 2020).

This paper describes and illustrates a new species of *Conomorium* Masi, 1924. We also give a differential diagnosis of the new species.

### Materials and methods

The studied specimens were collected from 32 pupae of *Sesamia cretica* Lederer, 1857, and 28 pupae of *S. nonagrioides* (Lefèbvre, 1827) in the rearing rooms at the Debal Khozaei Sugarcane Agro-Industrial Co., Ahwaz, Khuzestan, Iran. Larvae of these sugarcane stem borers are collected from the sugarcane fields at the Debal Khozaei Sugarcane Agro-Industrial Co., Ahwaz, Khuzestan, southwest of Iran, and maintained on sugarcane stems in rooms with stable laboratory conditions (28°C, 65% H). Emerged wasps are collected by an insect aspirator daily and deposited in 60% ethanol. The examined specimens and types of the new species are deposited in the insect collection of the Department of Plant Protection, Faculty of Agriculture, University of Birjand, Birjand, Iran.

Specimens were slide-mounted in Euparal for further morphological studies and photography. The species were identified by following the key of Doğanlar (2020). Morphological terminology follows that of Doğanlar (2020).

Abbreviations used in the key and descriptions according to Doğanlar (2020) are as follows:

POL	distance between posterior ocelli
OOL	distance between hind ocellus and eye
Ohm	the shortest distance between the hind ocellus and occiput
F1-F7	funicular segments
C1-C3	club segments
(A)	ratio of the distance between the tip of the temple and the distance between the levels of the hind tip of the temple and the midpoint of the occiput.

## Results and discussion

### *Conomorium iranum* sp. nov.

Fig. 1A-K

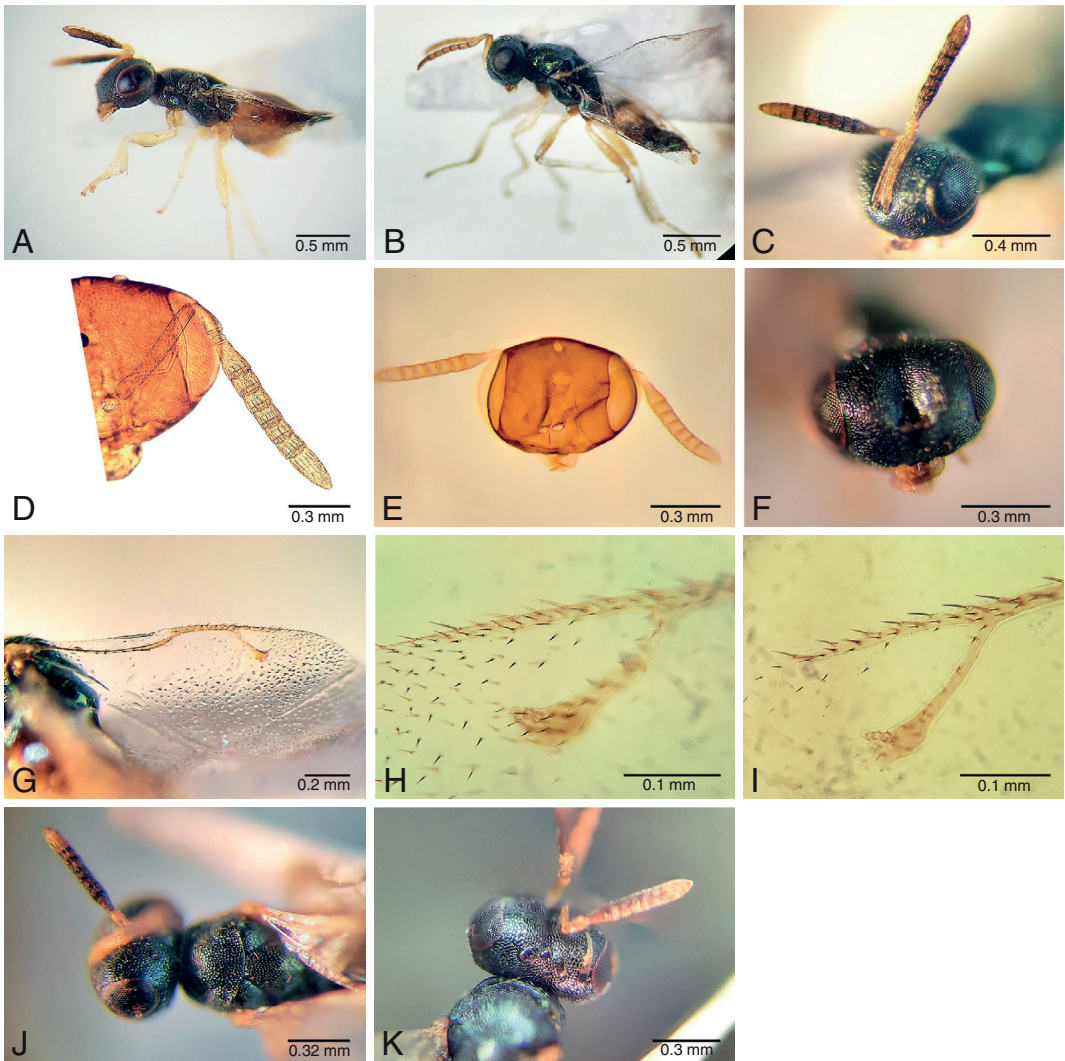
**Etymology.** The species name refers to the country of origin, Iran.

**Materials.** Holotype: ♀, Debal Khozaei Sugarcane Agro-Industrial Co., Ahwas, Khuzestan, SW Iran, 31°08'35"N 48°35'27"E, 13.iv.2021, emerged from *S. cretica* pupa collected from sugarcane at Debal Khozaei Sugarcane Agro-Industrial Co., Ahwas, Khuzestan, SW Iran, (A. Khadempour). – Paratypes: 3♂, 4♀, Debal Khozaei Sugarcane Agro-Industrial Co., Ahwas, Khuzestan, SW Iran, 31°08'35"N 48°35'27"E, 13.iv.2021, emerged from *S. cretica* and *S. nonagrioides* pupae collected from sugarcane at Debal Khozaei Sugarcane Agro-Industrial Co., Ahwas, Khuzestan, SW Iran, (A. Khadempour).

### Description

**Description of female.** Body length 2.2 mm. Head and mesosoma dark blue-black with metallic chandelier. Antenna with pale yellow scape; pedicel and anelli testaceous; flagellum fuscous. Setae on mesosoma dark. Coxae concolorous with body; rest of legs fuscous; except tarsi yellow. Wing hyaline; venation brownish testaceous; petiole and metasoma basal and apical thirds testaceous; other parts metallic dark brown to black (Fig. 1A).

The head (Fig. 1E,F,K) is about 1.2 times as wide as the mesoscutum. Vertex moderately convex; POL 1.1 OOL and 1.45 Ohm; (A)=5.0; temple smaller than eye length, forming a 110° angle with occiput. Eye in frontal view is three times as tall as wide, separated almost 1.3 times their height, inner orbits slightly diverging ventrally, malar sulcus superficial but traceable, malar space 0.32 times eye height (Fig. 1E,F). Head in frontal view, about 1.2 times as wide as high; lower margin of toruli at or slightly above the level of the lower ocular line; head in lateral view, with the lower face receding at an angle of about 70° to the upper face. Head reticulate, meshes very fine on gena and temple; clypeus almost smooth, its anterior margin broadly emarginate (Fig. 1E,F). Antenna (Fig. 1C,D), with the scape extending to almost the middle of the anterior ocellus; scape about 7.2 times as long as wide; pedicel in lateral view twice as long as wide; combined length of pedicel plus flagellum almost as long as head width and 1.7 times as long as scape; both anelli strongly transverse and subequal in length; funicle fusiform; first funicular segment 1.65 times as long as wide and 1.1 times as long as pedicel; distal third with a row of longitudinal sensilla; the subsequent



**Fig. 1.** Body parts of *Conomorium iranum* sp. nov.: **A.** female wasp; **B.** male wasp; **C.** antennae; **D.** face with details of antenna; **E.** microscopic view of the head; **F.** front view of the head; **G.** forewing of the female; **H.** area between post marginal vein and stigmal vein in forewing of the male; **I.** area between post marginal vein and stigmal vein in forewing of the female; **J.** above view of the thorax; **K.** occiput.

funicular segments transverse; the sixth about 1.3 times as wide as long; each segment with one row of longitudinal sensilla, densely covered with short setae; clava 2.2 times as long as wide and about 1.2 times as long as the first funicular segment.

Mesosoma (Fig. 1A, J) is about 1.3 times as long as wide, slightly bent in lateral view, with the dorsellum and propodeum sloping at an angle of about 20–25° with respect to the dorsal plane of the mesoscutum and scutellum. Pronotum short, distinctly narrower than mesoscutum; pronotal collar about 0.25 times

as long as mesoscutum; finely reticulate; its anterior edge distinctly carinate in the front margin; hind margin of pronotum with fine striae and shiny strip; and laterally a row of sparse, moderately long setae with fine reticulation. Mesoscutum about 2.13 times as wide as long; notauli superficial and extending about two-thirds lengths of mesoscutum; mesoscutum finely reticulate, meshes relatively high, areoles small. Scutellum 0.83 times as long as wide, almost flat in lateral view; reticulation on scutellum about as strong and coarse as on the posterior part of meso-

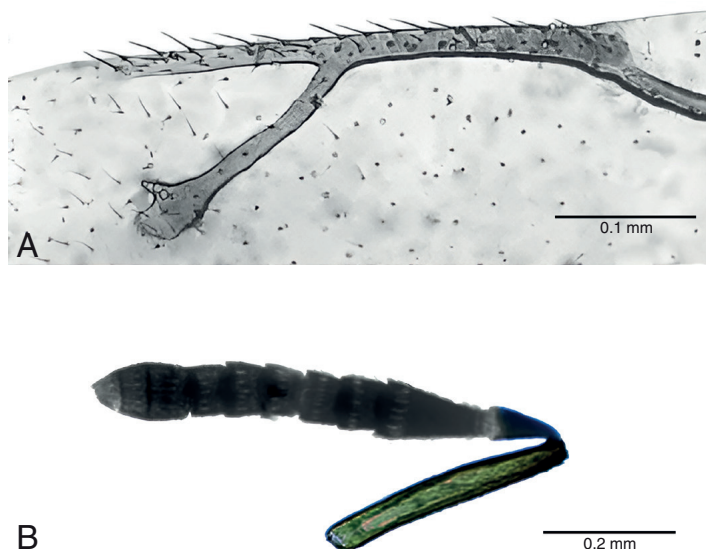


Fig. 2. Forewing and antenna in *Conomorium turhalensis* Doğanlar female: A. forewing; B. antenna.

scutum; areoles more or less isodiametric; sculpture on frenum almost smooth; scutellum on each side with 4 setae anterior to the frenal line; sculpture on inner half of axilla as strong as on scutellum; reticulation on outer half distinctly weaker but still slightly raised. Dorsellum with an anterior margin slightly raised, its surface almost smooth. Reticulation on meso- and metapleuron is about as strong as on mesoscutum, only very superficially reticulate. Forewing (Fig. 1G), 2.1 times as long as wide; basal cell bare; costal cell bare on the upper surface, lower surface with about 8–9 hairs in distal half; hair line widely spaced medially; wing disc on the upper surface with sparse and minute hairs beyond speculum; the area between post marginal vein and stigmal vein with 4–5 setae; the angle between stigmal vein and postmarginal vein  $45^\circ$ ; marginal vein 1.33 times as long as postmarginal vein and 1.05–1.1 times as long as stigmal vein which is 1.27 times as long as post marginal vein; stigma small; space between post marginal vein and stigma about 1.65 times of stigma length. Propodeum almost as long as scutellum; the median area 2.83 times as wide as long; two strong and straight median carinae; plica bent outwards in posterior half; median area almost smooth; spiracle separated from the posterior edge of metanotum almost by its longest diameter; the area between spiracle and plica convex; postspiracular sulcus finely reticulate; callus without setae; nucha without setae, forming a lunate, transversely aciculate strip, whose length occupies about one-third the median length of propodeum. Petiole is almost as long as wide

and distinctly narrow posteriorly. Gaster (Fig. 1A) subcircular, 1.3 times as long as wide, about 1.1 times as wide as mesoscutum, and almost as long as mesosoma; gastral tergites dorsally slightly sunken, the first tergite occupying 0.20 times the length of the gaster, its hind margin almost straight; tergites 1–4 smooth and shining; tergites 4–6 finely alutaceous laterally; the syntergite smooth. Ovipositor sheaths are not projecting (Fig. 1A).

**Description of male.** Body length 2.1 mm (Fig. 1B). Body colour is similar to female, except as follows (Fig. 1B): Antenna yellow; tips of flagellar segments and club blackish yellow; legs concolourous with body; their tips pale yellow; femora of the mid and hind legs dark yellow; tibiae and tarsi pale yellow. Petiole dirty yellow, first gastral tergite fuscous, and second tergite coucous.

Head (Fig. 1B, E, F, K) with POL 1.54 times OOL; malar space 0.32 times eye height. Antenna (Fig. 1C, D) with scape 1.13 times as long as eye height and about 6.4 times as wide, extending above vertex; ventral shiny. Plaque extending over upper 0.65 times the length of scape; combined length of pedicel plus flagellum 1.1 times as long as head width; pedicel in lateral view 1.5 times as long as wide; flagellum filiform; first funicular segment slightly constricted basally and about 1.1 times as wide as subsequent segments; second funicular segment about 1.5 times as long as wide and 1.1 times as long as the sixth segment; sixth funicular segment 1.38 times as long as wide; clava acumi-

nate, 3.0 times as long as wide, almost as long as two preceding funicular segments combined. The mesosoma is similar to female, except almost twice as long as wide. Fore wing 2.17 times as long as wide; basal cell bare; costal cell bare on the upper surface, lower surface with about 10–12 hairs in the distal half; hair line widely spaced medially; wing disc on the upper surface with sparse and minute hairs beyond speculum; area between postmarginal vein and stigmal vein with 8 setae (Fig. 1H); the angle between stigmal vein and postmarginal vein 30°; with marginal vein 1.3 times as long as postmarginal vein and 1.5 times as long as stigmal vein; stigma small; space between postmarginal vein and stigma about 0.42 times of the length of the stigma. Stigmal area with some setae on both sides and small setae in the upper corner. Petiole is about 0.9 times as wide as long, moderately widening posteriorly (Fig. 1B). Gaster (Fig. 1B) is oblong, about 3.1 times as long as lateral wide; lateral margins are almost parallel up to the tip; the hind margin of the first tergite is straight.

**Diagnosis.** The species *C. iranum* sp. nov. differs from the other species of the genus by having setae (4–5 setae in females and 8 setae in males) on the upper side of the area between the postmarginal and stigmal vein in the forewing (Fig. 1G–I) and malar space, which is 0.32 times the eye height (Fig. 1A–C). *C. turhalensis* Doğanlar, another species in the genus that has setae on the upper side of the area between postmarginal and stigmal vein in the forewing (Fig. 2A), differs from *C. iranum* sp. nov. in the following: malar space in *C. turhalensis* is 0.23 times the eye height, while in *C. iranum* sp. nov. it is 0.32 times; the angle between stigmal vein and postmarginal vein in the forewing of *C. iranum* sp. nov. females is 45°, while this angle in *C. turhalensis* is 53°; POL in *C. turhalensis* is 1.23x OOL while in *C. iranum* sp. nov. it is 1.1x; in *C. iranum* sp. nov. females, scape is 7.2 times as long as wide but in *C. turhalensis* scape is narrower and its 8.86 times as long as wide; in *C. iranum* sp. nov. females combined length of pedicel plus flagellum is almost as long as head width and 1.7 times as long as scape but in *C. turhalensis* these ratios are 0.88 and 1.44, respectively (Fig. 2B). *C. iranum* sp. nov. is apparently similar to *C. helvociogluae* Doğanlar and *C. hacipasanensis* Doğanlar sharing e.g., a dorsally depressed and subcircular mesosoma and dark coloured metasoma in females and oblong metasoma in males. Furthermore, some morphological and morphometrical characters between these species are similar. However, they are simply differentiable by the area between the postmarginal and stigmal vein in the forewing, which in species *C. helvociogluae* Doğanlar and *C. hacipasanensis* Doğanlar is bare.

**Biology.** This species is a gregarious parasitoid of sugarcane stem borers, *S. cretica* and *S. nonagrioides*, in Khuzestan province, Iran. Other aspects of the biology of this new described species are still unknown.

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