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Two new records of the genus *Conophorus* (Diptera: Bombyliidae: Bombyliinae) from Iran

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Abstract: The genus *Conophorus* Meigen, 1803 (Diptera: Bombyliidae: Conophorini) was studied in the north and northwestern parts of Iran. Three species of the genus *Conophorus* were identified; two of them are recorded for the first time from Iran, namely: *C. pseudaduncus* Paramonov, 1929 and *C. rjabovi* Paramonov, 1929, in addition to *C. glaucescens* (Loew, 1863), which was previously recorded in Iran. Morphological characters, geographical distributions, and an identification key for the three collected species are provided.

Keywords: Diptera, Bombyliidae, *Conophorus*, new record, Iran.

Introduction

Family Bombyliidae, commonly called bee flies, is one of the largest families of Diptera (Brachycera) with more than 4600 known species worldwide (Evenhuis and Greathead, 2003). These flies occur in all continents, but are most common in arid and semiarid environments (Hull, 1973), and poorly represented in the Arctic, Antarctic and oceanic Islands. Their larvae are predators or parasitoids of eggs and larvae of other insects such as other Diptera, Hymenoptera, Coleoptera and Lepidoptera (Du Merle, 1975). Some species are important natural enemies of major pests including locusts and grasshoppers, armyworms, slug and nettle caterpillars, and tsetse flies (Evenhuis and Greathead,1999). Adults generally feed on nectar and pollen, thus may play an important role in pollination of wild flowers (Hull, 1973).

The genus *Conophorus* Meigen, 1803 (Bombyliidae: Bombyliinae: Conophorini) occurs only in the Palaearctic and Nearctic regions and includes 67 known species (Evenhuis and Greathead, 1999). It belongs to the tribe Conophorini, can be distinguished by the following combination of characters: postcranium flattened with a single occipital foramen; scape strongly swollen, flagellum without an apical sulcus, palpi present; tibial spurs absent; abdomen ovate or cordate (Greathead and Evenhuis, 1997). According to the world catalog of bee flies (Evenhuis and Greathead, 1999), six species of this genus have been previously recorded from Iran, namely: *C. virescens* (Fabricius, 1787), *C. syriacus* Paramonov, 1929, *C. rossicus* Paramonov, 1929, *C nobilis* (Loew, 1873), *C. monticola* Paramonov, 1929, *C. asiaticus* Paramonov, 1929. In the present study, three species of genus *Conophorus* collected from the north and northwest of Iran are briefly reviewed, and basic information for further studies is provided.

Materials and Methods

Materials for this study were collected from some parts of north and northwestern Iran using Malaise traps during 2008-2011 (Fig. 1).

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Samplings were performed during March to November. Specimens were dehydrated in 99.6% ethanol for 5-10 minutes and then placed in a pure solution of hexamethyldisilazane (HMDS) for 15-20 minutes. The specimens were finally placed in a glass plate for drying. The dried specimens were then labeled. Illustrations were made using the Olympus SZX9 stereomicroscope equipped with a Sony CCD digital camera. Female genitalia preparations were made by macerating the apical portion of abdomen in cold 10% KOH for 14-15 hours, then washed with distilled water, transferred to fresh glycerin and mounted on slide. Morphological terminology follows Greathead and Evenhuis (1997), Zaitzev (1966) and Paramonov (1929). All specimens are deposited in the insect collection of the Department of Entomology, Tarbiat Modares University, Tehran, Iran.

Figure 1 Northern Iran where *Conophorus* specimens were collected.

Results

Three species of the genus *Conophorus* including: *C. glaucescens*, *C. pseudaduncus* and *C. rjabovi* were collected and identified from the studied area. Two species *C. pseudaduncus* and *C. rjabovi* are new records for the fauna of Iran.

Key to species of the genus *Conophorus* collected in this study

1- Wing with three submarginal cells (Fig. 2A), scutellum laterally bulged, body covered with yellow hairs (Fig. 2B).....……. *Conophorus glaucescens* (Loew, 1863)

- Wing with two submarginal cells, scutellum normal, not bulged (Fig. 3A, 4A)……2

2- Wing transparent, vein R_{2+3} deeply curved apically (Fig. 3A), ……..…….. *Conophorus pseudaduncus* Paramonov, 1929

- Wing smoky, vein R_{2+3} slightly curved apically (Fig. 4A)……..…….. *Conophorus rjabovi* Paramonov, 1929

***Conophorus glaucescens* (Loew, 1863) (Fig. 2)**

Ploas glaucescens Loew, 1863: 34.

Material examined: IRAN, *Qazvin province*, Zarabad, 36°38′ N, 48°35′ E, 1520 m.a.s.l, 13.vi. 2008, (1♂, 1♀); Highway Qazvin-

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Zanjan, 36°28′ N, 50°24′ E, 1735 m.a.s.l, 23.v.2009, (1♀); Zereshk road, 36°25′ N, 50°06′ E, 1926 m.a.s.l, 26.v.2011, (1♀), *East Azerbaijan province*, Arasbaran, 26.VI.2009, (1♂); leg. B. Gharali; (Fig. 1).

General distribution: Western Palaearctic (Mediterranean, Central Asia) (Evenhuis and Greathead, 1999), Iran (Sakenin Chelav *et al*., 2008).

Diagnosis: Head (Fig. 2B): as wide as thorax; occiput gray, with black hairs; frons swollen, with long black hairs; antenna basally with white hairs; ocellar triangle gray with long black hairs; scape four times as long as pedicel, black and swollen, with long black hairs ventrally and white hairs laterally, pedicel gray with` black hairs dorsally, first flagellomere long, conical, second flagellomere about 0.3 as long as pedicel, proboscis as long as head. Thorax (Fig. 2B): mesonotum with long black hairs; scutellum black, with median groove, covered with golden yellow hairs. Wing (Fig. 2A): transparent, *r-m* vein at extreme base of discal cell (*dm*). Halter yellow. Legs: black, femora with scattered long white hairs; tibia with black spines; empodium white and equal to claws in length. Abdomen (Fig. 2B): gray, tergites covered with yellow hairs and yellow scales, lateral margin of tergites with long black hairs, sternites gray with long white hairs. Female genitalia (Fig. 3C): spermathecal reservoir ellipsoid and brown, apical spermathecal duct very long, gradually flattened towards reservoir, about 10 times the length of spermathecal reservoir, sperm pump sclerotized with upper valve, basal spermathecal duct about 1/6 the length of sperm pump, common spermathecal duct very short, furca U-shaped.

***Conophorus pseudaduncus* Paramonov, 1929 (Fig. 3)**

Conophorus pseudaduncus Paramonov, 1929: 218 (154).

Material examined: IRAN, *Qazvin province*, Zereshk road, 36°26′ N, 50°06′ E, 2050 m.a.s.l, 11.vi.2009, (3♂, 2♀); Yazan, 35°45′ N, 49°37′ E, 1849 m, 15.v.2009, (1♂, 1♀), Leg. B. Gharali. Zereshk road, 36°25′ N, 50°06′ E, 1926 m, 26.v.2011, (1♀). Leg. M. Kheirandish (Fig. 1).

General distribution: Central Asia (Evenhuis and Greathead, 1999). New record from Iran.

Diagnosis: Head (Fig. 3B) as wide as thorax in dorsal view; ocellar triangle black with short black hairs; antenna black, with yellow hairs dorsally and black hairs ventrally, flagellomere ellipsoid, narrowed basally, first flagellomere equal to pedicel and scape combined; proboscis as long as head. Thorax (Fig. 3B): mesonotum with long greenish-yellow hairs; scutellum with greenish-yellow hairs. Wing (Fig. 3A): transparent, with two submarginal cells, *r-m* vein positioned before middle of discal cell, vein R_{2+3} strongly curved apically. Halter stalk yellow and club black. Legs: black, femora with greenish yellow scales; tibia with black spines; tarsi brown, with black spines, empodium white and equal to claw in length. Abdomen: black, covered with long greenish yellow hairs. Female genitalia: spermathecal reservoir (Fig. 3C) pear-shaped, sclerotized and brown, furca U-shaped (Fig. 3D), lateral arms strongly sclerotized and inwardly bent.

***Conophorus rjabovi* Paramonov, 1929 (Fig. 4)**

Conophorus rjabovi Paramonov, 1929: 179 (117).

Material examined: IRAN, *Alborz province*, Shahrestanak, 35°57′N, 51°22′E, 2305 m.a.s.l., 25.v.2010, (1♂); *Gilan province*, Ghazichak, 36°45′N, 50°19′E, 1803 m.a.s.l., 18.v.2010, (1♀); Leg. M. kheirandish; (Fig. 1).

General distribution: Central Asia (Evenhuis and Greathead, 1999). New record from Iran.

Diagnosis: Head (Fig. 4B): as wide as thorax in dorsal view; occiput black, covered with black and yellow hairs; frons black, covered with black and yellow hairs; antenna black, scape with black hairs, about 1.5 times of pedicel in length, covered with scattered short black hairs and two long black hairs in lateral margins, first flagellomere ellipsoid, equal in length to that of pedicel and scape combined, proboscis as long as head. Thorax (Fig. 4B): mesonotum with long yellow hairs; scutellum with short yellow hairs. Wing (Fig. 4A): smoky, with two submarginal cells, cross vein *r-m* before middle of discal cell,

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vein R_{2+3} slightly curved apically. Halter yellow. Legs: black, covered with black and yellow scales and scattered black spines. Abdomen (Fig. 4B): black, covered with long pale yellow and black hairs. Female genitalia: spermathecal reservoir (Fig. 4C) conical, sclerotized and brown, apical spermathecal duct six times of sperm pump in length, sperm pump membranous, basal spermathecal duct 1.5 times the length of sperm pump, common spermathecal duct equal to sperm pump in length, furca U-shaped (Fig. 4D), lateral arms strongly sclerotized and inwardly bent, acanthophorite with sixteen spines (Fig. 4D).

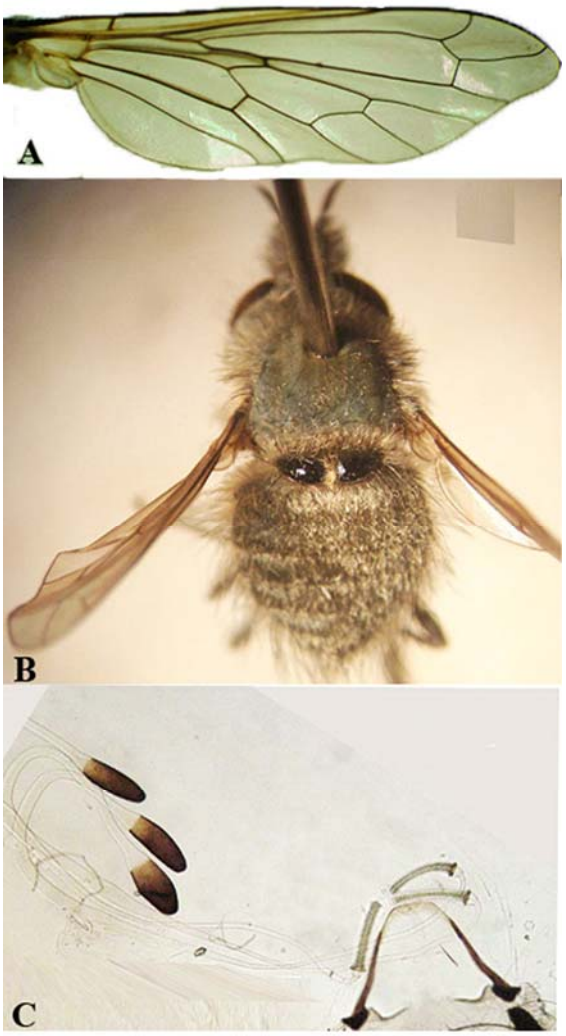

Figure 2 *Conophorus glaucescens,* female: A) wing, B) dorsal view of general habitus, C) female genitalia.

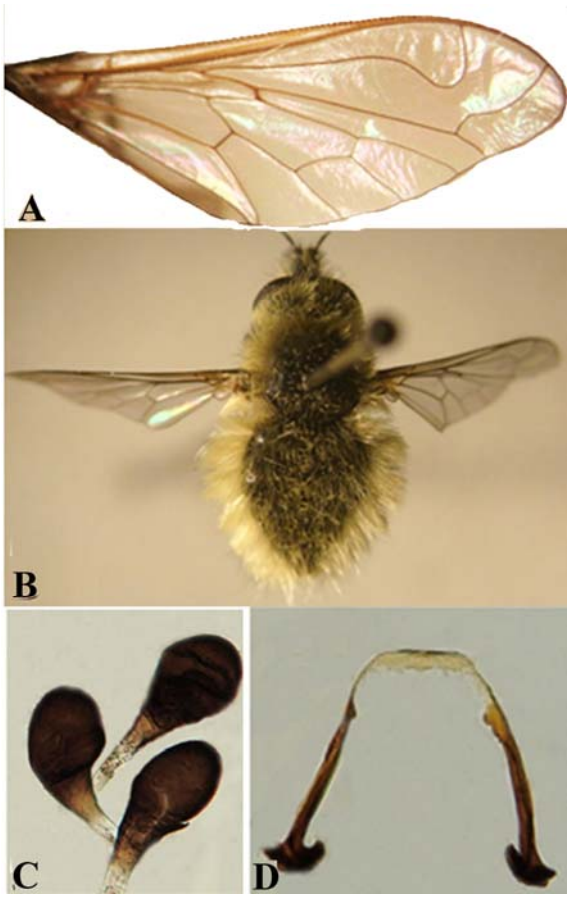

Figure 3 *Conophorus pseudaduncus,* female: A) wing, B) dorsal view of general habitus, C) spermathecal reservoir, D) furca.

Discussion

The genus *Conophorus* has been reported from tropical, temperate and Mediterranean climates (Evenhuis and Greathead, 1999). The samples in the current study were also collected from temperate areas in northern and north-western Iran in late May to June. With respect to the current study, the number of Iranian species of the genus *Conophorus* increases up to 11 (Evenhuis and Greathead, 1999). Three species of this genus have only been recorded from Egypt (El-hawagry, 2002; Evenhuis and Greathead, 1999); two species from Slovakia (Evenhuis and Greathead, 1999) and five species from Turkey (Dils and Ozbeck, 2006). The checklist of the tribe

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Bombyliini published by Hakimian *et al.* (2012) compiles 5 genera and 39 species. However, the tribe Conophorini was poorly studied in Iran and only 7 species of the genus *Conophorus* have previously been reported from Iran (Sakenin Chelav *et al.*, 2008; Evenhuis and Greathead, 1999). Further studies are necessary to have a good insight into the bombyliid fauna of Iran.

Figure 4 *Conophorus rjabovi*, female: A) wing, B) dorsal view of general habitus, C) spermathecal reservoir, D) furca and the last abdominal segments.

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گزارش دو رکورد جدید از جنس *Conophorus* (Diptera: Bombyliidae: Bombyliinae) از ایران

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چکیده: جنس *Conophorus* Meigen, 1803 (Diptera: Bombyliidae: Conophorini) در شمال و شمال غرب ایران مورد مطالعه قرار گرفت. سه گونه *C. glaucescens* (Loew, 1863)، *C. pseudaduncus* Paramonov, 1929 و *C. rjabovi* Paramonov, 1929 از این جنس شناسایی شدند که دو گونه *C. pseudaduncus* Paramonov, 1929 و *C. rjabovi* Paramonov, 1929 برای اولین بار از ایران گزارش می‌شوند. خصوصیات ظاهری، دامنه پراکنش و کلید شناسایی برای این سه گونه ارائه شده است.

واژگان کلیدی: Diptera، *Conophorus*، Bombyliidae، Bombyliinae, Conophorini، گزارش‌های جدید، ایران.

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