

Research Article

Two new records of the genus *Exoprosopa* (Diptera: Bombyliidae: Anthracinae) from Iran

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Abstract: The genus *Exoprosopa* Macqurt, 1840 (Diptera: Bombyliidae: Anthracinae) was studied in the north central Iran. Four species of the genus *Exoprosopa* were identified of which *E. minos* (Meigen, 1804) and *E. grandis* (Pallas, 1818) were previously recorded from northern parts of Iran (or north of Iran) and two species namely *E. efflatounbeyi* Paramonov, 1928 and *E. altaica* Paramonov, 1925 are newly recorded from Iran. A key to the species in north central Iran is provided. Morphological diagnostic characters and geographical distribution of the collected species are briefly discussed.

Keywords: Diptera, Bombyliidae, *Exoprosopa*, new records, Iran

Introduction

The Bombyliidae, commonly known as bombiliids or bee flies, is a large family with more than 4600 known species in 230 genera worldwide (Evenhuis and Greathead, 1999; Hull, 1973). The genus *Exoprosopa* Macqurt, 1840, belonging to the tribe Exoprosopini and subfamily Anthracinae, includes 70 described species in the Palaearctic region (Evenhuis and Greathead, 1999). The species of this genus are characterized by the following morphological features: postcranium with deep or shallow troughs around divided occipital foramen; eyes with bisecting line; cross vein r-m at or before middle of discal cell, $R_2 + 3$ arising from a right angle between the origin of R_s and r-m cross vein, $R_2 + 3$ arising

opposite to r-m cross vein or close to it, wing with $r_1-r_2 + 3$ present but r_4-r_5 absent (3 submarginal cells), face projecting, wing pattern differing or almost completely hyaline, R_5 cell open, antennae with scape and pedicel quadrate and of similar width, flagellum elongate, body and vestiture with different color, hind tibia with small scale laying flat (Greathead and Evenhuis, 1997). Twenty three species of this genus have previously been recorded from Iran (Evenhuis and Greathead, 1999) Although, several faunistic and taxonomic studies have been carried out on the Bombyliidae in Iran (Linder, 1975; Evenhuis and Greathead, 1999; Gharali, 2010; Gharali *et al.*, 2010; Karimpour, 2012; Hakimian *et al.*, 2012a, b, c; Hakimian *et al.*, 2013a, b) the fauna of Anthracinae need more investigations in the country.

The objective of this study is to provide an initial taxonomic and faunistic insight into species belonging to the genus *Exoprosopa* in steppes, shrublands and forests of north central Iran.

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Materials and Methods

Materials for this study were collected from some parts of north central Iran using Malaise traps (Fig. 1). Sampling was performed during March to November of 2010-2011. Specimens were dehydrated with 99.6% ethanol for 5-10 minutes and then placed in a pure solution of hexamethyldisilazane (HMDS) for 15-20 minutes (Brown, 1993). The specimens were finally placed in a glass plate for drying. The dried specimens were then labeled. Photographs were taken by using the Olympus SZX9 stereomicroscope equipped with a Sony CCD digital camera. Morphological terminology follows Greathead and Evenhuis (1997) and Paramonov (1928). All specimens are deposited in the insect collection of the Department of Entomology, Tarbiat Modares University, Tehran, Iran.

Results

Four species of the genus *Exoprosopa* including *E. efflatounbeyi*, *E. altaica*, *E. minos* and *E.*

grandis were collected and identified from the studied area. Two species namely *E. efflatounbeyi* and *E. altaica* are new records for the fauna of Iran.

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

- 1- Wing transparent, except costal region with brownish yellow pattern (Fig. 2A).....
.....*Exoprosopa minos* (Meigen, 1804)
- Wing with brown or black pattern (Figs. 2B–D).2
- 2- Wing with two dark transversal stripes, basal stripe from costal vein to anal cell, apical stripe from costal cell to m_2 cell, bm and br cells transparent apically brown (Fig. 2B).....
.....*Exoprosopa grandis* (Pallas, 1818)
- Wing pattern different (Figs. 2C–D). 3
- 3- Wing nearly uniformly dark, with transparent spots in middle of discal and bm cells, wing tip transparent at r_{2+3} and r_4 cells (Fig. 2C)
....*Exoprosopa efflatounbeyi* Paramonov, 1928



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

- Wing with mottled pattern (Fig. 2D).....*Exoprosopa altaica* Paramonov, 1925

***Exoprosopa minos* (Meigen, 1804)** (Figs. 2A & 3A)

Anthrax minos Meigen, 1804: 207.

Material examined: IRAN, Gilan province, Rahim abad, 36°45'N, 50°20'E, 1787 m.a.s.l., 03.viii.2010, (1♀), 10.viii.2010, (1♂); Qazvin province, Zereshk road, 36°25'N, 50°06'E, 1926 m.a.s.l., 29.vi.2011, (1♀). Leg. M. Khayrandish.

General distribution: Western Palaearctic (Mediterranean, Central Asia) (Evenhuis and Greathead, 1999).

Diagnosis: Head (Fig. 3A): occiput black covered with white and yellow scales, frons black, covered with black hairs; antenna black, scape rectangular, covered with black hairs in lateral margin, about 3.5 times as long as pedicel, pedicel globular, covered with black hairs marginally, first flagellomere about 1.5 times as long as scape, second flagellomere dark brown, with styli; face conically produced, covered with yellow scales, proboscis as long as head.

Thorax (Fig. 3A): black, covered with yellow hairs and scales and long black hairs in hind margin; scutellum (Fig. 3A) brown, ¼ basal margin black, covered with yellow hairs and scales and long black hairs in hind margin; legs black, covered with white scales and black spines. **Wing** (Fig. 2A): transparent, c, sc, br and r₅ cells brown; Halter pale brown. **Abdomen** (Fig. 3A): black, first tergite with two brown spots laterally, tergites covered with pale yellow, black and pale brown hairs and scales, sternites covered with white hairs and scales.

***Exoprosopa grandis* (Pallas, 1818)** (Figs. 2B & 3B)

Anthrax grandis Pallas in Wiedemann, 1818a: 10. *Nomen nudum*.

Material examined: IRAN, Alborz province, Shahrestanak, 35°57'N, 51°22'E, 2305 m.a.s.l., 20.vii.2010, (1♀). Leg. M. Khayrandish.

General distribution: Western Palaearctic (Mediterranean, Central Asia), Iran (province not defined) (Evenhuis and Greathead, 1999).

Diagnosis: Head (Fig. 3B): occiput black covered with dense yellow scales, frons yellow, covered with dense yellow scales and scattered black hairs, face yellow, covered with scattered black hairs; scape yellow, covered with scattered black hairs, pedicel cylindrical, covered with black hairs, flagellum long conical, about 3 times the length of pedicel, without styli, proboscis as long as head. **Thorax** (Fig. 3B): mesonotum black, covered with dense yellow hairs and scales in anterior margin; scutellum (Fig. 3B) reddish brown, covered with scattered yellow scales; trochanter covered with dense yellow scales, claws without empodia. **Wing** (Fig. 2B): with two dark longitudinal stripes, basal stripe from costal vein to anal cell, apical stripe from costal cell to m₂ cell, bm and br cells transparent except apically brown; halter apically yellow, basally brown. **Abdomen** (Fig. 3B): black, anterior margin of all tergites covered with dense yellow scales, posterior margin of all tergites covered with black scales, posterior margin of fifth to seventh tergites covered with black hairs.

***Exoprosopa efflatounbeyi* Paramonov, 1928** (Figs. 2C & 3C)

Exoprosopa efflatounbeyi Paramonov, 1928a: 226 (48)

Material examined: IRAN, Tehran province, Shahriar, 35°40'N, 50°56'E, 1168 m.a.s.l., 15.vi.2010, (1♀). Leg. M. Khayrandish.

General distribution: South western Palearctic (Southwest Asia) and Northeastern Afrotropical (Evenhuis and Greathead, 1999). New record for Iran.

Diagnosis: Head (Fig. 3C): occiput black covered with yellow scales and black hairs, frons pale brown, covered with pale brown scales and black hairs, face conical, brown, covered with white scales and black hairs; scape brown, covered with scattered black

hairs, about 3 times of pedicel in length, pedicel black, covered with black hairs, flagellum 2-segmented, first flagellar segment about 1.5 times longer than scape, second flagellar segment half the length of scape; proboscis as long as head. **Thorax** (Fig. 3C): front margin covered with long yellowish brown hairs, lateral margin covered with brownish yellow and black scales and long black hairs, mesonotum covered with yellowish brown to black scales and black hairs, sterna covered with brownish yellow and black hairs; scutellum (Fig. 3C) reddish brown, covered with scattered yellow scales; legs dark brown, femur covered with yellowish brown and black scales and scattered black thorn, tibia and tarsus covered with black scales. **Wing** (Fig. 2C): with a transparent spot in middle of the discal cell and middle of the bm cell, wing tip transparent at R₄₊₅ and R₄ cells; halter dark brown, apex with yellow spot. **Abdomen** (Fig. 3C): sterna pale brown, covered with yellow hairs, terga dark brown, lateral and hind margins pale brown, lateral sides of first abdominal segments covered by dense brownish yellow hairs, lateral sides of all tergites covered with dense black hairs, tergites covered with yellow and black scales and black hairs.

***Exoprosopa altaica* Paramonov, 1925** (Figs. 2D & 3D)

Exoprosopa altaica Paramonov, 1925a: 46.

Material examined: IRAN, Qazvin province, Zereshk road, 36°25' N, 50°06' E, 1926 m.a.s.l, 27.vii.2011, (1♀); 03.viii.2011, (1♂); Gilan province, Ghazi chack, 36°45' N, 50°19' E, 1803 m.a.s.l, 05.vii.2010, (1♂); Leg. M. Khayrandish.

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

Diagnosis: **Head** (Fig. 3D): occiput black, covered with white and pale yellow scales and black hairs, frons black, covered with black scales and black hairs, face conically produced, black; antenna black, scape brown, about 1.5 times of pedicel in length,

lateral margins with black hairs, first flagellomere about 2 times longer than scape, second flagellomere half the length of the first flagellomere, second flagellomere with styli, proboscis as long as head. **Thorax** (Fig. 3D): black, front and hind margins covered with black hairs and pale yellow scales, scutellum black, hind margins brown, covered by pale yellow and black scale and black hairs; legs black, covered with black and brown scales and scattered black hairs. **Wing** (Fig. 2D): black, with transparent spots in discal cell costal cell, m₂, m₁, cup cells, at cross veins, two transparent spots in R₂₊₃ cell, R₄ cell transparent; halter black. **Abdomen** (Fig. 3D): tergites black, covered with pale yellow, brown and black scales and black hairs, sternites covered with black hairs.

Discussion

The genus *Exoprosopa* 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 north central Iran in late June to August. With respect to the current study, the number of Iranian species of the genus *Exoprosopa* increases to 25 species. Twelve species of this genus have been recorded from Afghanistan (Evenhuis and Greathead, 1999) and eighteen species from Egypt (El-hawagry and Evenhuis, 2008; Evenhuis and Greathead, 1999). Most of the previously recorded species in Iran were from southern parts of Iran (Evenhuis and Greathead, 1999) which were not within the scope of our study. We did not include these species in the key because they were not accessible to us and their morphological characters were not checked. Since Iran has various geographical regions and climates, it would be expected that many additional species remain to be discovered in Iran.

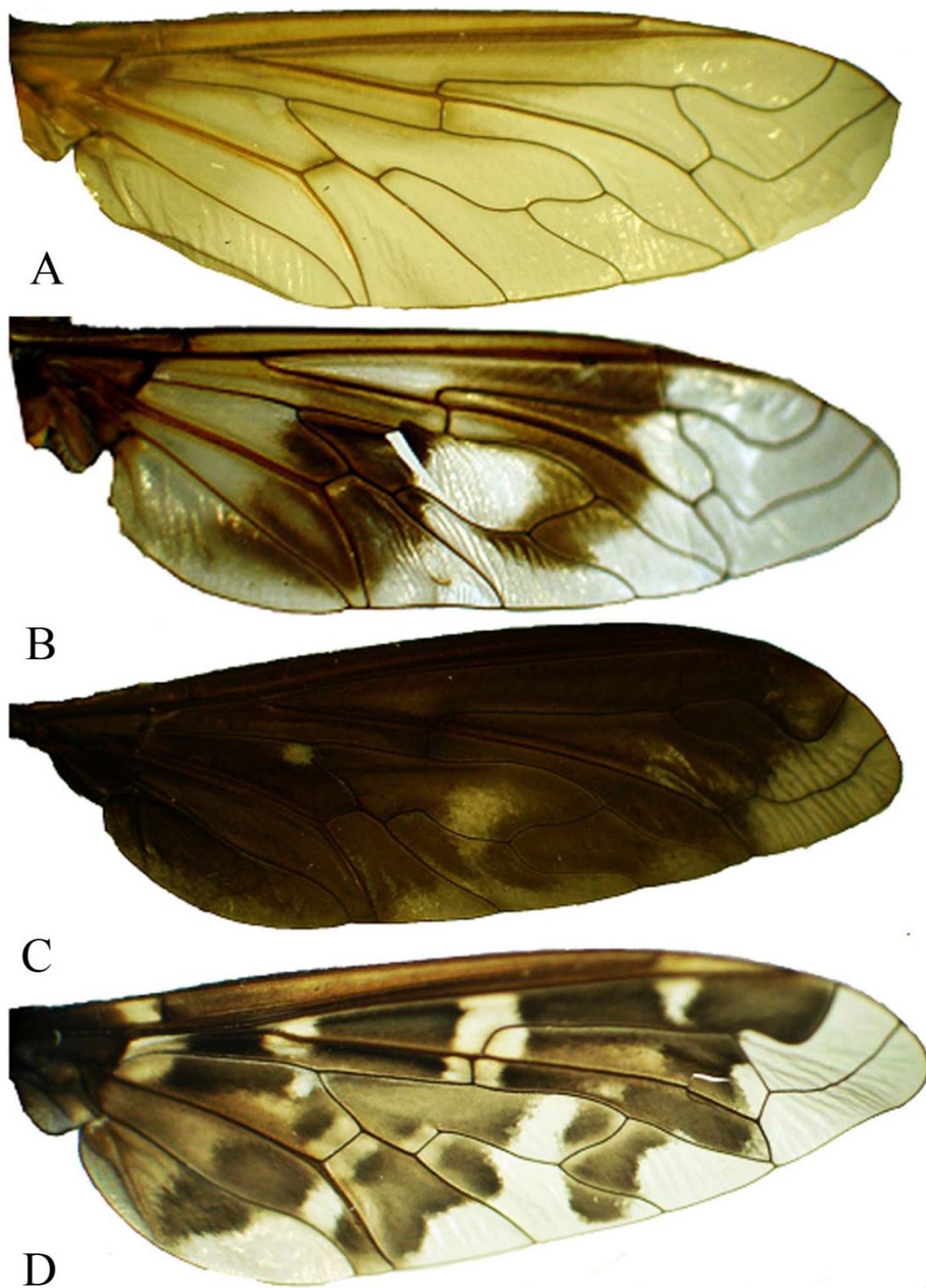


Figure 2 Wing color and venation patterns of *Exoprosopa* species; A) *E. minos*, B) *E. grandis*, C) *E. efflatounbeyi*, D) *E. altaica*.



Figure 3 General habitus of *Exoprosopa* species (dorsal view); A) *E. minos*, B) *E. grandis*, C) *E. efflatounbeyi*, D) *E. altaica*.

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References

- Brown, V. B. 1993. A further chemical alternative to critical-point-drying for preparation of small (or large) flies. *Fly Times*, 11: 10.
- Du Merle, P. 1975. Les hôtes et les stades pré-imaginaux des Diptères Bombyliidae: revue bibliographique annotée. *Bulletin de la Section Régionale Ouest Paléarctique*, 4: 1-289.
- El-Hawagry, M. S. A. and Evenhuis, N. L. 2008. An updated key to the genera of Egyptian bee flies (Diptera: Bombyliidae). *Egyptian Journal of Biology*, 10: 104-121.
- Evenhuis, N. L. and Greathead, D. J. 1999. *World Catalog of Bee Flies (Diptera: Bombyliidae)*. Backhuys Publishers, Leiden, 756 pp.
- Greathead D. J. and Evenhuis, N. L. 1997. Family Bombyliidae. pp. 487-512. In: Papp, L., Darvas, B. (Eds.), *Manual of Palaearctic Diptera (with special reference to flies of economic importance)*, Volume II. Science Herald Press, Budapest.
- Gharali, B. 2010. Identification and species diversity of flies superfamily Bombyloidea in the north-west of Iran. Ph.D. dissertation, Tarbiat modares University, 225 pp.
- Gharali, B. Kamali, K., Evenhuis, N. and Talebi A. A. 2010. Two new species of the genus *Apolysis* (Apolysini, Bombyliidae, Diptera) from the north of Iran. *Zootaxa*, 2441: 41-52.
- Hakimian, S., Talebi, A. A and Gharali, B. 2012a. First record of *Cononedys bituberculata* Becker, 1915 (Insecta: Diptera: Bombyliidae) from Iran, with description of the spermatheca. *Check List*, 8 (4): 776-778.
- Hakimian, S., Talebi, A. A and Gharali, B. 2012b. First record of *Amictus pictus* Loew, 1869 (Diptera: Bombyliidae: Cylleniinae) from Iran. *Check List*, 8 (4): 774-775.
- Hakimian, S., Talebi, A. A and Gharali, B. 2012c. A study of the tribe Bombyliini (Diptera: Bombyliidae: Bombyliinae) of Iran with description of female genitalia. *Zoology and Ecology*, 22 (3-4): 212-225.
- Hakimian, S., Talebi, A. A and Gharali, B. and Farahani, S. 2013a. Three new records of the genus *Lomatia* Meigen, 1822 (Diptera: Bombyliidae) from Iran. *Biharean Biologist*, 7 (1): 1-6.
- Hakimian, S., Talebi, A. A and Gharali, B. 2013b. Two new records of the genus *Conophorus* (Diptera: Bombyliidae: Bombyliinae) from Iran. *Journal of Crop Protection*, 2 (1): 101-107.
- Hull, F. M. 1973. Bee flies of the world. The genera of the family Bombyliidae. *Bulletin of the United States National Museum*, 286: 1- 687.
- Linder, E. 1975. Bombyliidae aus dem Iran (Diptera). *Stuttgarter Beiträge zur Naturkunde*, 275: 1-19.
- Karimpour, Y. 2012. On the bee fly (Diptera: Bombyliidae) fauna from West Azarbaijan Province of Iran. *Biharean Biologist*, 6 (2): 81-86.
- Paramonov, S. J. 1928. Beiträge zur Monographie der Gattung *Exoprosopa*. *Trudy Fizichno-Matematichnoho Viddilu Ukraïns'ka Akademiia Nauk*, 6 (2): 181-303.

اولین گزارش دو گونه از جنس *Exoprosopa* (Diptera: Bombyliidae: Anthracinae) از ایران

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چکیده: جنس *Exoprosopa* Macqurt, 1840 (Diptera: Bombyliidae: Anthracinae) در شمال مرکزی

ایران مورد مطالعه قرار گرفت. از این جنس چهار گونه شناسایی شد که دو گونه *E. minos*

(Meigen, 1804) و *E. grandis* (Pallas, 1818) قبلاً از ایران گزارش شده‌اند ولی دو گونه *E. efflatounbeyi*

Paramonov, 1928 و *E. altaica* Paramonov, 1925 برای اولین بار از ایران گزارش می‌شوند. کلید

شناسایی گونه‌ها در منطقه مورد مطالعه ارائه شده است. خصوصیات ظاهری و دامنه پراکنش چهار گونه

شناسایی شده در تحقیق حاضر تهیه شده است.

واژگان کلیدی: Diptera, Bombyliidae, *Exoprosopa*, گزارش‌های جدید، ایران