

Study of the genera *Hercostomus* Loew, 1857 and *Poecilobothrus* Mik, 1878 (Diptera: Dolichopodidae) in Kandovan Valley with new records for Iran

Samad KHAGHANINIA^{1,*}, Yaser GHARAJEDAGHI¹ and Igor GRICHANOV²

1. University of Tabriz, Department of Plant Protection, Faculty of Agriculture, 51664, Tabriz, I.R.Iran

2. All-Russian Institute of Plant Protection, Podbelskogo 3, 196608 St. Petersburg, Pushkin, Russia.

*Corresponding author, S. Khaghaninia, E-mail: skhaghaninia@gmail.com

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Abstract. Based on specimens collected from the Kandovan Valley (East Azerbaijan Province) during 2010-2011, seven species were recognized. Three species of the genus *Hercostomus* [*Hercostomus gracilis* (Stannius), *H. libanicola* Parent and *H. rusticus* (Meigen)] and four species of the genus *Poecilobothrus* [*Poecilobothrus armeniorum* (Stackelberg), *P. basilicus* (Loew), *P. chrysozygos* (Wiedemann) and *P. comitalis* (Kowarz)] were recorded from Iran for the first time. Photos of adult habitus and key characters are given. A revised key to the Palaearctic species of the genus *Poecilobothrus* is also provided.

Key words: Dolichopodidae, *Hercostomus*, *Poecilobothrus*, Iran, key.

Introduction

The Dolichopodidae is a very large family of the order Diptera with more than 7500 described species. The genus *Hercostomus* Loew, 1857 is one of the biggest genera of subfamily Dolichopodinae (Dolichopodidae) with about 500 known species in the world and 130 species of this genus occurring in the Palaearctic Region, of which only three species were known to occur in Iran (Negrobov & Matile 1974, Grichanov et al. 2010). Morphologically it differs from the closest genera by the following combination of characters: Body medium to large size, scape with hairs above, thorax lacking distinct dark spot above notopleuron, mid tibia with at least one strong ventral seta, hind basitarsus without bristles above, and epandrial lobe reduced to 1-2 setae. Biologically all species are polyphagous predators feeding on various fine invertebrates, but adults of some species of this genus are known to feed on nectar (Grichanov 2007, Grichanov et al. 2011).

The genus *Poecilobothrus* Mik, 1878 numbers 14 western Palaearctic species and subspecies. Morphologically it is close to *Hercostomus*, differing by the following combination of characters: Body medium to large size, hind femur with anterior seta positioned at apex, thorax with distinct dark spot above notopleuron, epandrial lobe well developed (Grichanov et al. 2011).

Materials and methods

Materials were collected by sweeping net (standard size and method) on flower heads of some plants of families Asteraceae, Apiaceae and Ranunculaceae in seven localities of the Kandovan Valley (East Azerbaijan Province, Iran) during 2010-2011 (Fig. 1). The Kandovan Valley is one of the longest Sahand chain mountain valleys, being about 12 km long, located in the south-east of East Azerbaijan Province. This biosphere reserve situated in the south of Sul-tan mountain, one of the Sahand's summits, at about 35.5 km distance from Tabriz city, with UTM (Universal Transfer Mercator)

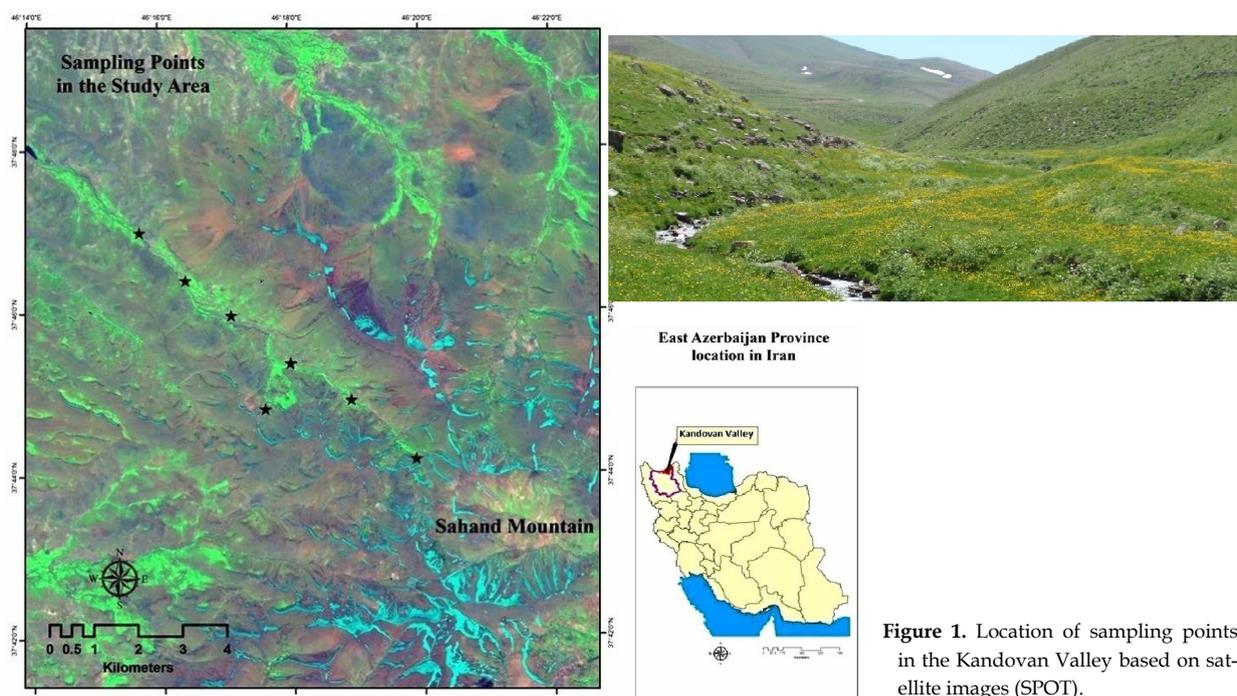


Figure 1. Location of sampling points in the Kandovan Valley based on satellite images (SPOT).

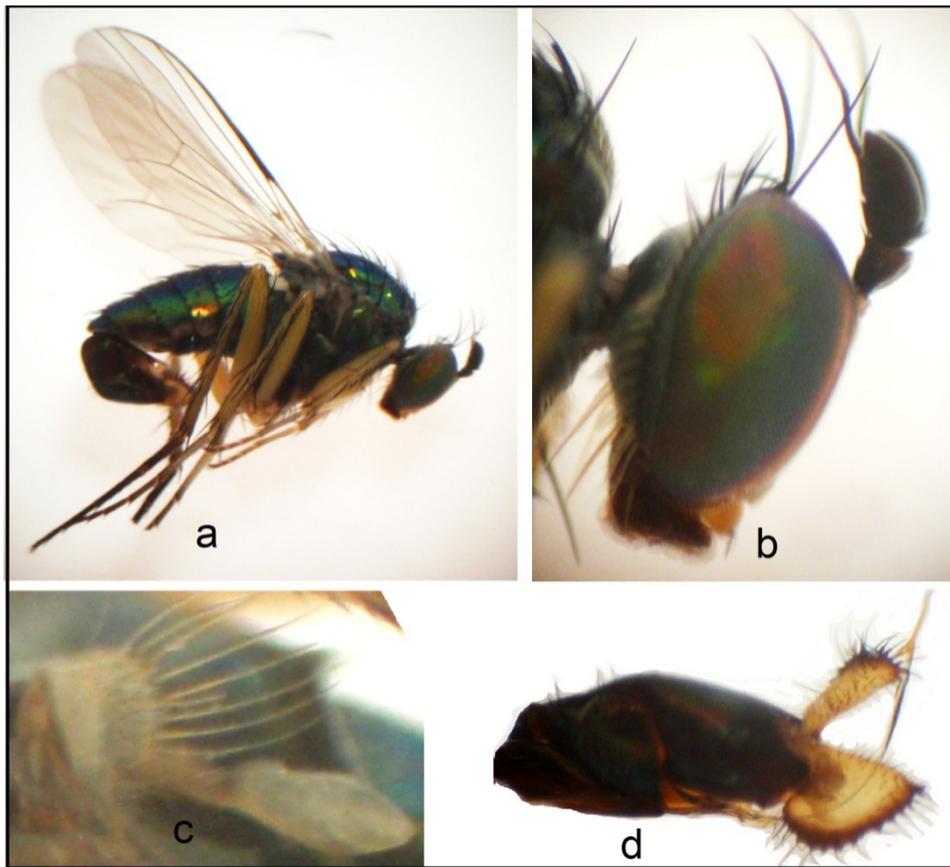


Figure 2. *Hercostomus gracilis*; a) habitus, lateral view, b) head, lateral view, c) lower calypter cilia, dorsal view, d) hypopygium of male, lateral view.

coordinate system, X from 609181.42 to 617583.55 E, Y from 4177170.42 to 4183938.80 N, and varying in altitude from 1860 m to 3110 m a.s.l. This area has rich grass lands populated with various plant species of Asteraceae, Apiaceae, Leguminaceae, Poaceae and Ranunculaceae. The collected specimens are deposited at the Insect Museum of Tabriz University (IMTU). Distribution part of the list includes adjacent countries and notes on the general distribution for each species after Grichanov (2007) and Grichanov's online database DoliBank (available from <http://dolicho.narod.ru/Genera3.htm>).

Results

In this study, three species of the genus *Hercostomus* [*H. gracilis* (Stannius), *H. libanicola* Parent and *H. rusticus* (Meigen)] and four species of the genus *Poecilobothrus* [*P. armeniorum* (Stackelberg), *P. basilicus* (Loew), *P. chrysozygos* (Wiedemann) and *P. comitalis* (Kowarz)] were collected from the Kandovan Valley. All species are newly reported for the Iranian insect fauna. Species are listed in alphabetic order.

Subfamily Dolichopodinae

Genus *Hercostomus* Loew, 1857

Hercostomus gracilis (Stannius, 1831) (Fig. 2)

Dolichopus gracilis Stannius, 1831

Material examined: 2 ♂♂, Kandovan, 37°44 N, 46°19 E, 3005 m, 2 August 2010.

Diagnostic characters: Body 5-6 mm. Antenna com-

pletely black, stylus bare. Lower postocular setae yellow. Lower calypter cilia pale. R_{4+5} and M_{1+2} convergent, costa thickened at R_1 . Femora yellow, tibia yellow, fore tibia bearing long apicoventral seta, hind tarsus dark. Cercus triangular, yellow, brown at margin (Fig. 2) (Grichanov, 2007).

Distribution: Armenia, Austria, Belgium, Bulgaria, Czech, Denmark, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Spain, Sweden, Tajikistan, Turkey, Turkmenistan, UK and Ukraine (Carpathians). New to the Iranian insect fauna.

Hercostomus libanicola Parent, 1933 (Fig. 3)

Material examined: 1 ♂, Kandovan, 37°45 N, 46°18' E, 2844 m, 24 May 2010; 1 ♂, 37°44 N, 46°19 E, 3005 m, 2 August 2010.

Diagnostic characters: Body 5-5.5 mm. Antenna pale-brown. Lower postocular setae yellow. Lower calypter cilia black. R_{4+5} and M_{1+2} convergent. Femora yellow, mid femur with basoventral convexity bearing short black setae, tibia yellow, hind tarsus black. Cercus mainly yellow and rounded (Fig. 3) (Grichanov, 2007).

Distribution: Lebanon, Turkey. New to the Iranian insect fauna.

Hercostomus rusticus (Meigen, 1824) (Fig. 4)

Dolichopus rusticus Meigen, 1824

Material examined: 4 ♂♂, Kandovan, 37°46 N, 46°15 E, 2341 m, 25 June 2010; 3 ♂♂, 37°45 N, 46°17 E, 2696 m, 25 June 2011; 1 ♂, 37°46 N, 46°16 E, 2496 m, 2 August 2011.

Diagnostic characters: Body 3 mm. Antenna completely

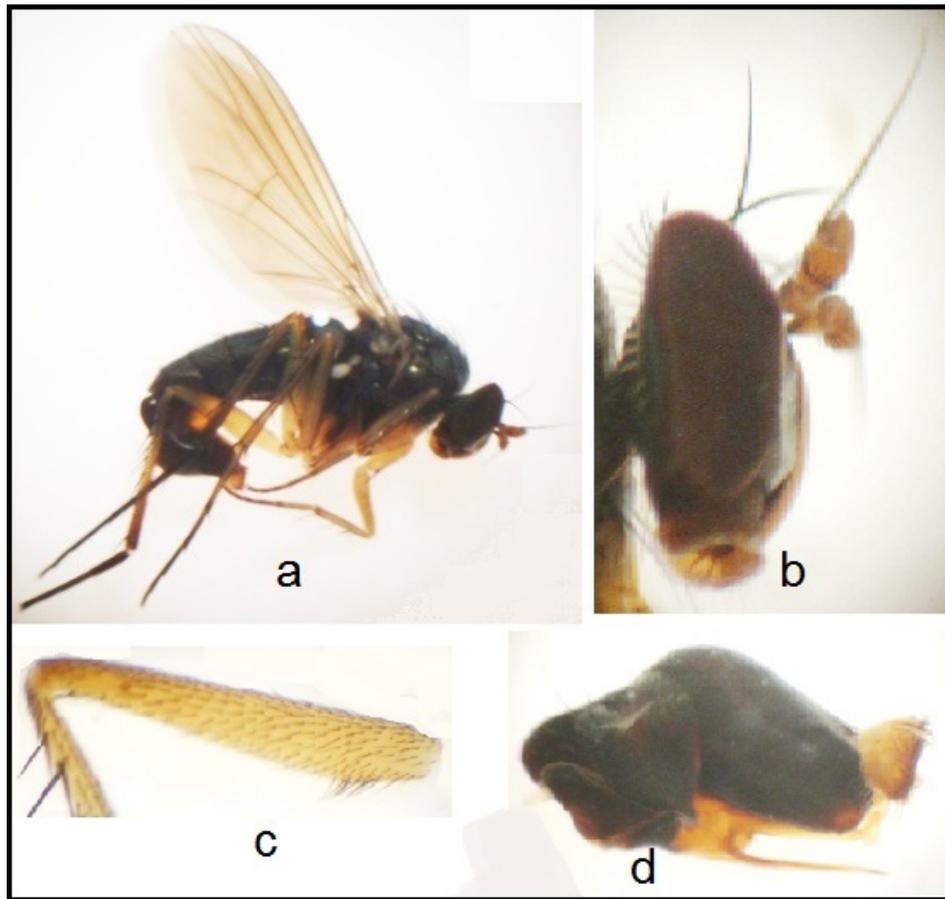


Figure 3. *Hercostomus libanicola*; a) habitus, lateral view, b) head, lateral view, c) mid femur, lateral view, d) hypopygium of male, lateral view.

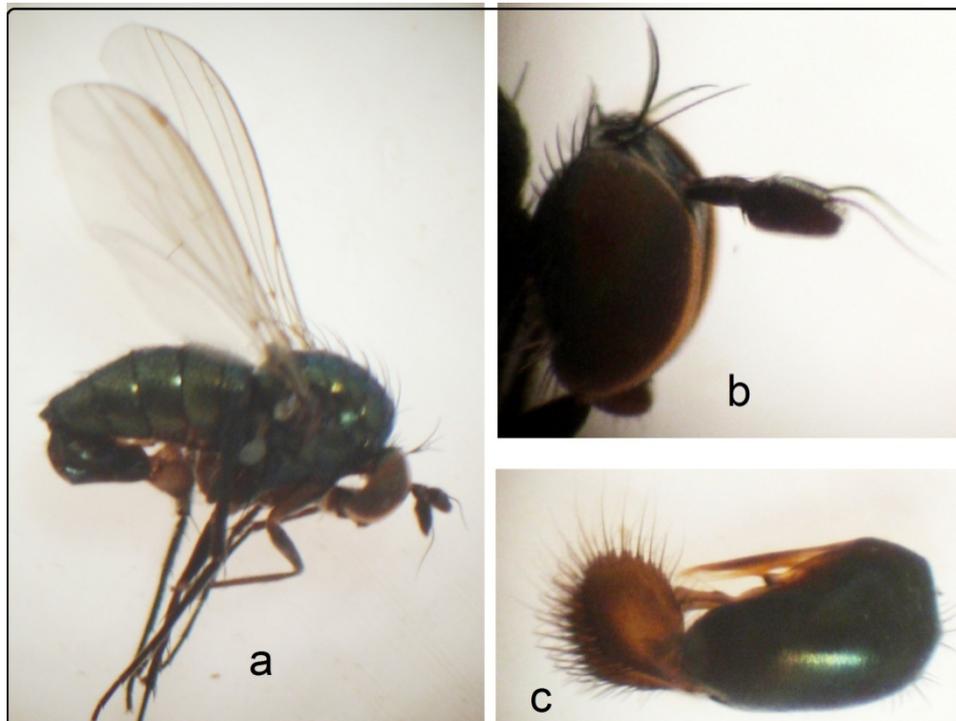


Figure 4. *Hercostomus rusticus*; a) habitus, lateral view, b) head, lateral view, c) hypopygium of male, lateral view.

black, postpedicel lanceolate in apex, stylus bare. Lower postocular setae yellow. Lower calypter cilia black. R_{4+5} and M_{1+2} convergent, legs completely black. Cercus dark-brown (Fig. 4) (Grichanov, 2007).

Distribution: Abkhazia, Armenia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Czech, Estonia, France, Georgia, Germany, Greece, Hungary, Italy, N Kazakhstan, Macedonia, Mongolia, Netherlands, Poland, Romania, Russia (Blagoveshchensk, Buryatia, Dagestan, Kabardino-Balkaria, Krasnodar, Krasnoyarsk, Omsk, Samara, Yakutia), Slovakia, Spain, Switzerland, Ukraine (Crimea, Poltava). New to the Iranian insect fauna.

Genus *Poecilobothrus* Mik, 1878

Poecilobothrus armeniorum (Stackelberg, 1933) (Fig. 5)

Hercostomus armeniorum Stackelberg, 1933

Material examined: 1 ♂, Kandovan, 37°44' N, 46°19' E, 3005 m, 2 August 2010.

Diagnostic characters: Body 5 mm. Antenna completely dark, stylus rarely pubescent. Frons metallic green, weakly pollinose. Lower postocular setae yellow. Lower calypter cilia black. R_{4+5} and M_{1+2} weakly convergent. Mesonotum with purple lateral spot, scutellum bare dorsally. Fore coxa yellow, femora yellow, hind tibia gradually darkened in apical part, tibia mainly yellow, mid and hind tarsus black. Cercus triangular with pointed apex, black-brown (Fig. 5) (Grichanov, 2007).

Distribution: Armenia, Azerbaijan, Russia (Adygea, Kabardino-Balkaria, Karachai-Cherkessia, Krasnodar, Kursk). New to the Iranian insect fauna.

Poecilobothrus chrysozygos (Wiedemann, 1817) (Fig. 6)

Dolichopus chrysozygos Wiedemann, 1817

Hercostomus chrysozygos (Wiedemann, 1817)

Material examined: 4 ♂♂, Kandovan, 37°45' N, 46°18' E, 2844 m, 24 May 2010; 7 ♂♂, 37°45.311' N, 46°18.075' E, 2844 m, 24 May 2011.

Diagnostic characters: Body 4-5 mm. Antenna completely yellow except brown apex, stylus bare. Lower postocular setae yellow. Lower calypter with black cilia. Metapleuron and posterior part of mesonotum bare. R_{4+5} and M_{1+2} convergent. Femora yellow, some segments of fore tarsus

with white and black rings, hind tarsus black. Cercus trapezoidal, black-brown (Fig. 6) (Grichanov, 2007).

Distribution: Armenia, Austria, Belarus, Belgium, Bulgaria, Czech, Denmark, France, Germany, Hungary, NE Kazakhstan, Latvia, Moldova, Netherlands, Poland, Romania, Russia (Adygea, Karachai-Cherkessia, Krasnodar, Lipetsk, Mordovia, Moscow, Voronezh, Ural, Khabarovsk), Slovakia, Spain, Sweden, Switzerland, Turkey, UK, Ukraine (Kharkiv, Kherson, Odessa). New to the Iranian insect fauna.

Poecilobothrus comitalis (Kowarz, 1867) (Fig. 7)

Gymnopternus comitalis Kowarz, 1867

Hercostomus comitalis (Kowarz, 1867)

Material examined: 1 ♂, Kandovan, 37°46' N, 46°15' E, 2341 m, 25 June 2010.

Diagnostic characters: Body 7 mm. Antenna scape and pedicel yellow, first segment of flagellum black, stylus rarely pubescent. Lower postocular setae yellow. Lower calypter with black cilia. R_{4+5} and M_{1+2} rarely convergent. Femora yellow, tibia yellow, hind tarsus black. Cercus trapezoidal, brown at basal, black at apex (Fig. 7) (Grichanov, 2007).

Distribution: Armenia, Bulgaria, Czech, France, Germany, Hungary, Moldova, Romania, Russia (Krasnodar, Voronezh, Lower Volga), Slovakia, Turkey, Ukraine (Chernovtsy, Kherson, Uzhhorod), Kazakhstan, Kyrgyzstan and Tajikistan. New to the Iranian insect fauna.

Poecilobothrus basilicus (Loew, 1869) (Fig. 8)

Gymnopternus basilicus Loew, 1869

Hercostomus basilicus (Loew, 1869)

Material examined: 4 ♂♂, Kandovan, 37°42' N, 46°18' E, 2863 m, 5 September 2010.

Diagnostic characters: Body 8-9 mm. Antennal scape and pedicel yellow, first segment of flagellum dark-brown, stylus rarely pubescent. Face greyish-white. Lower postocular setae pale. Wing distinctly dark in anterior half and along costal vein. Lower calypter cilia black. Femora yellow, hind tibia dark or blackish in distal 1/4 or 1/5, hind and mid basitarsi entirely black. Cercus trapezoidal, black-brown (Fig. 8) (Grichanov, 2007).

Distribution: Azerbaijan, Israel and Italy. New to the Iranian insect fauna.

Key to the Palaearctic species of the genus *Poecilobothrus* (males)

Remarks: An outdated key to the Palaearctic species of Stackelberg (1941) comprised 8 species. Here we provide a revised key to 14 species and subspecies of the genus, based on the key to species of the Caucasus and East Mediterranean compiled by Grichanov (2007). Five species of the genus are presently known from Iran.

1. Hind basitarsus with 2-4 dorsal setae; 6.0-7.0.....*regalis* (Meigen)
 - Hind basitarsus bare above.....2
2. Wing at apex with strongly pronounced milky-white spot; antenna black; 6.0-7.0.....*nobilitatus* (Linnaeus)
 - Wing at apex without milky-white spot.....3
3. All femora, fore and mid tibiae entirely or partly (on apices) black; hind tibia entirely black.....4
 - Femora, fore and mid tibiae entirely yellow, sometimes hind femur dark at apex; hind tibia entirely yellow or dark in distal 1/4 or 1/5.....6
4. Hind tibia cylindrical, without plumage; wing with distinct anal lobe; 3.5.....*caucasicus* (Stackelberg)
 - Hind tibia flattened, with black dorsal and ventral plumage; wing without anal lobe, cuneate.....5
5. Femora and fore tibia black; 4.0-4.9.....*varicoloris varicoloris* (Becker)
 - Fore and mid femur almost entirely yellow, blackish at extreme apex dorsally; hind femur orange-yellow, black at apex; fore tibia orange brownish in basal half; 5-6.....*varicoloris flavifemoratus* Grichanov et Tonguç

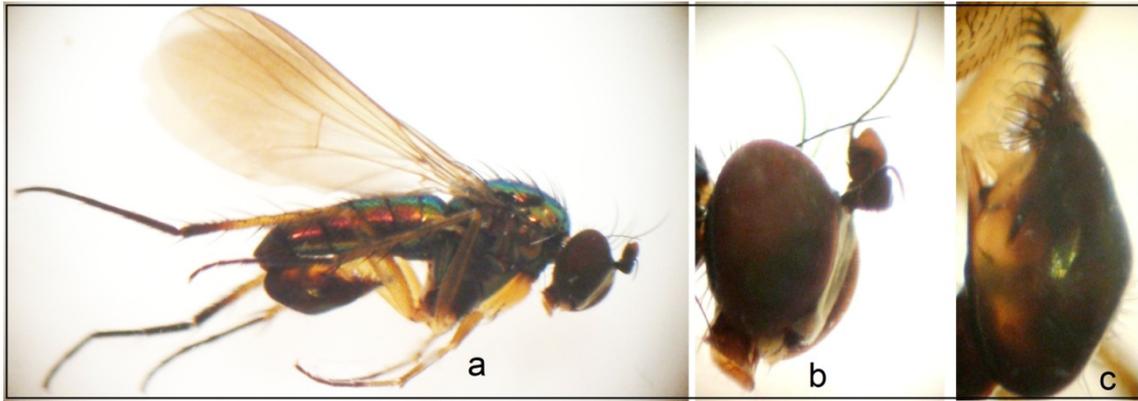


Figure 5. *Poecilobothrus armeniorum*; a) habitus, lateral view, b) head, lateral view, c) hypopygium of male, lateral view.

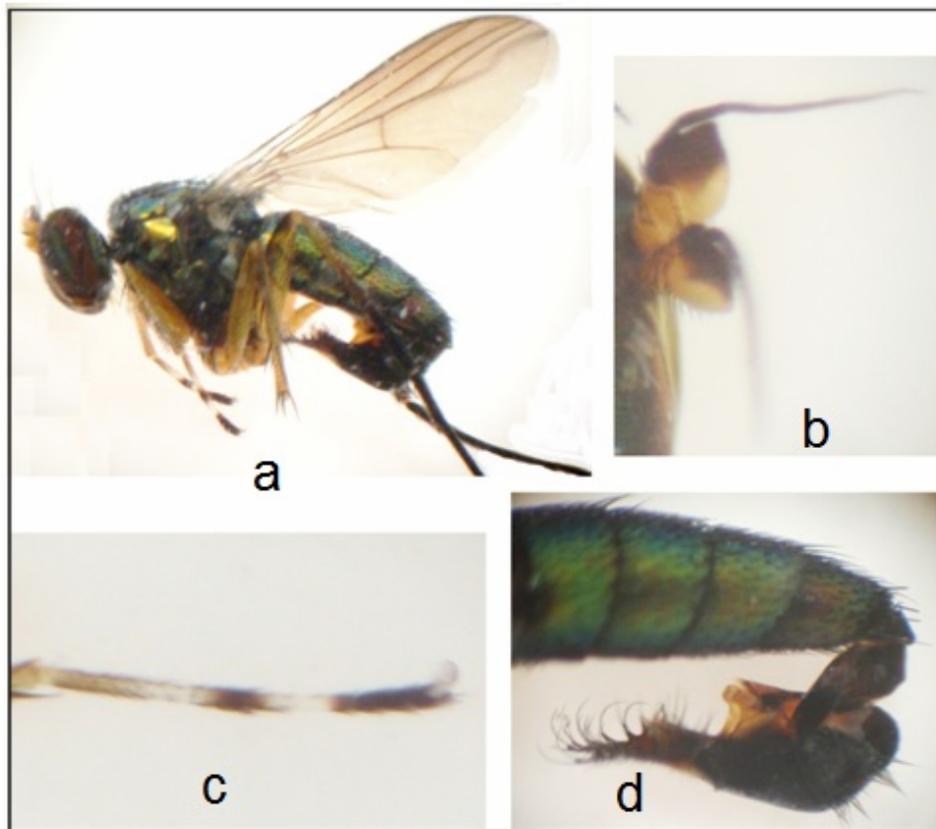


Figure 6. *Poecilobothrus chrysozygos*; a) habitus, lateral view, b) antenna, lateral view, c) fore tarsus, lateral view, d) hypopygium of male, lateral view.

- 6. Face ochre-yellow or golden-yellow.....7
- Face snow-white or greyish-white, at most slightly yellowish under antennae.....9
- 7. Antenna mostly yellow-orange, postpedicel black in apical half; first two segments of fore tarsus with white and black rings; 5.0-6.0.....*chrysozygos* (Wiedemann)
- Antennal postpedicel entirely black; fore tarsus not annulated.....8
- 8. Scape and pedicel (except dorsal side) reddish-yellow; wing weakly and regularly darkened; fore coxa yellow; 4.5-7.0.....*comitalis* (Kowarz)
- Antenna black, scape reddish-yellow ventrally at apex; wing distinctly dark in anterior half; fore coxa grey; 4.5-6.0.....*ducalis* (Loew)
- 9. Antenna entirely black.....10
- At least scape broadly yellow ventrally.....11
- 10. Femora and tibiae mainly brownish yellow; hind femur with blackish spot dorsally at apex; 5.0-6.0.....*bigoti* Mik
- Femora and tibiae mainly pale yellow; hind femur entirely yellow; 4.0.....*armeniorum* (Stackelberg)

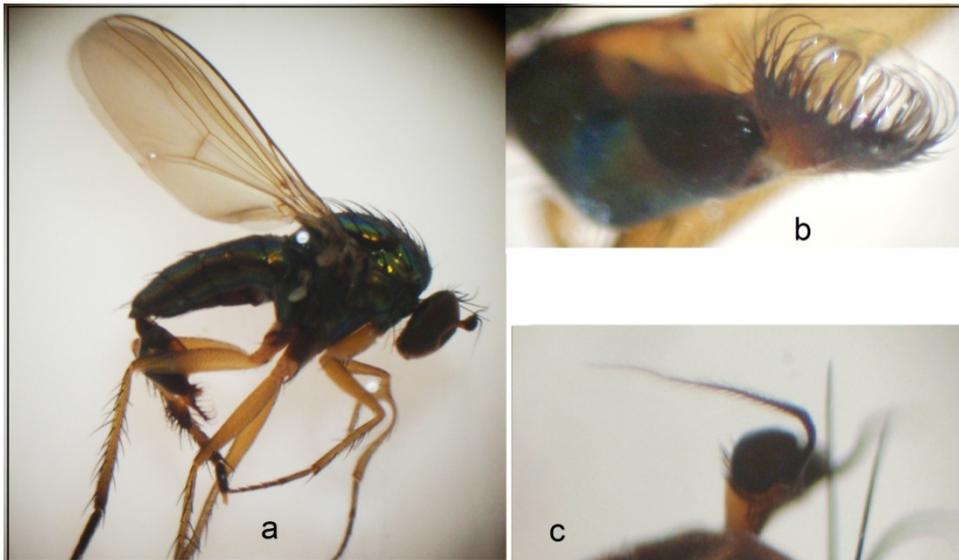


Figure 7. *Poecilobothrus comitalis*; a) habitus, lateral view, b) hypopygium of male, lateral view., c) antenna, lateral view.

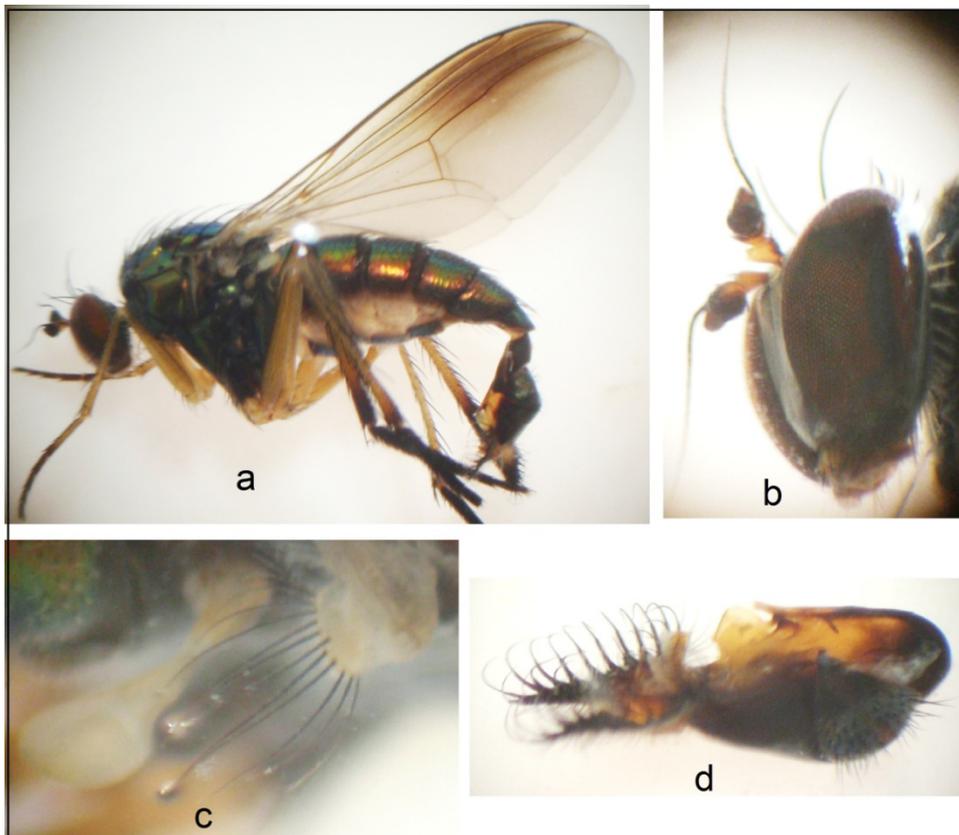


Figure 8. *Poecilobothrus basilicus*; a) habitus, lateral view, b) head, lateroventral view, c) lower calypter cilia, laterodorsal view, d) hypopygium of male, lateral view.

11. Postpedicel more or less largely yellow at base; hind coxa mostly or entirely yellow; thorax and abdomen dark, metallic green or bronze.....12
 - Antennal postpedicel entirely black; hind coxa black except apex, grey pollinose.....13
 12. Wing distinctly brown in anterior half; thorax and abdomen dark, metallic green or bronze; hind tibia black at apex; hind tarsus entirely black; 4.5-6.0.....*principalis* (Loew)
 - Wing transparent, rather weakly darkened; thorax and abdomen shining light green; hind tibia yellow to apex; hind basitarsus yellow at base; 4-5.....*clarus* (Loew)

13. Hind tibia entirely yellow; hind basitarsus mainly brownish yellow; mid basitarsus entirely yellow; 4.5 mm *majesticus* d'Assis Fonseca
 - Hind tibia dark or blackish in distal 1/4 or 1/5; hind and mid basitarsi entirely black; 4.5-6.0 *basilicus* (Loew)

Discussion

The Iranian fauna of Dolichopodidae is poorly known. Grichanov et al. (2010) compiled a list of Dolichopodidae of the country including 38 species belonging to 17 genera. Before this study, Negrobov and Matile (1974) found three species of the genus *Hercostomus* [*H. chetifer* (Walker), *H. leptocercus* Stackelberg, and *H. longiventris* (Loew)] in Iran and Grichanov et al. (2010) recorded *Poecilobothrus regalis* (Meigen) in the fauna. Recently, Khaghaninia et al. (2013) added six species (*Dolichopus longitarsis* Stannius, 1831, *D. salictorum* Loew, 1871, *D. simplex* Meigen, 1824, *Hercostomus fulvicaudis* (Haliday, 1851), *Sciapus flavicinctus* (Loew, 1857), and *Sybitroma nodicornis* Meigen, 1824) of this family to the list of country. The present paper increases the faunal list of Iran to 51 species.

References

- Grichanov, I.Y. (2007): A checklist and keys to Dolichopodidae (Diptera) of the Caucasus and East Mediterranean. St. Petersburg: VIZR RAAS (Plant Protection News Suppl., ISSN 1815-3682). 160 p.
- Grichanov, I.Y., Alikhani M., Rabieh M.M. (2010): New data on the distribution of Dolichopodidae (Diptera) in Iran. An International Journal of Dipterological Research 21(3): 195-201.
- Grichanov, I.Y., Selivanova O.V., Negrobov, O.P. (2011): A brief synopsis of Palaearctic genera of the family Dolichopodidae (Diptera). Ukrainska Entomofaunistyka 2(2): 11-40.
- Khaghaninia, S., Gharajedaghi, Y., Grichanov, I.Y. (2013): Additional notes about long-legged flies (Diptera: Dolichopodidae) in East Azerbaijan province of Iran. Biharean Biologist 7(1): 42-47.
- Negrobov, O.P., Matile L. (1974): Contribution à la faune de l'Iran: Diptera, Dolichopodidae. Annales de la Société Entomologique de France 10: 841-845.
- Stackelberg A.A. (1941): Dolichopodidae. (Lindner, P.E. ed.). Die Fliegen der Palaearktischen Region. Stuttgart. IV, 5(29), 138: 177-224.