Eight new species of Dolichopodinae (Diptera: Dolichopodidae) from northern Iran

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Abstract

Dipterological surveys were conducted in different sites in western and central parts of northern Iran (Guilan, Mazandaran, Kordestan, East and West Azerbaijan and Ardabil provinces) during 2010–2011 using Malaise traps, and during 2012–2014 employing sweep nets. A total of 110 species were collected, including 42 Dolichopodinae. Eleven dolichopodine species proved new to science, eight of which are described here: *Dolichopus fuscicercus* sp. nov., *D. subimmaculatus* sp. nov., *Gymnopternus flavitibia* sp. nov., *G. atratus* sp. nov., *Hercostomus setitibia* sp. nov., *H. albicoxa* sp. nov., *Poecilobothrus annulitarsis* sp. nov. and *P. innotabilis* sp. nov. Some of these species strongly resemble European species and even share near identical conspicuous male secondary sexual characters.

Key words: Dolichopodidae, Dolichopodinae, *Dolichopus*, *Gymnopternus*, *Hercostomus*, *Poecilobothrus*, new species, Iran, Caspian Hyrcanian Mixed Forests

Introduction

With over 7,100 described species worldwide, long-legged flies (Diptera: Dolichopodidae) currently represent the fourth largest dipteran family, after Limoniidae, Tachinidae and Asilidae (Pape et al. 2009). The family consists of 17 subfamilies, including the basal Microphorinae and Parathalassiinae, and 15 other subfamilies, generally referred to as Dolichopodidae s. str. (Pollet & Brooks 2008). The Dolichopodinae is by far the most speciose of all subfamilies with over 1,700 described species in 33 genera. It includes species rich and widespread genera like *Dolichopus* Latreille and *Hercostomus* Loew with their main distribution in the Holarctic and Oriental realms respectively. Other genera like *Gymnopternus* Loew and *Poecilobothrus* Mik are considerably more restricted in their distribution, and the latter is even only known from the Palaearctic Region (Yang et al. 2006). Although long-legged flies can be encountered in nearly every terrestrial and semi-aquatic habitat type, in general species prefer humid to moist conditions. It is therefore no surprise that the highest diversities and abundances are found in rainforests, marshes and on banks of various waterbodies (Pollet 2000). As many species exhibit a pronounced habitat affinity, the family as such serves well as bio-indicator or in site quality assessments, in particular of humid biotopes (Pollet 2009a). Apart from the plant mining *Thrypticus* Gerstäcker larvae, in general both adults and larvae are predatory and feed on small invertebrates (Dyte 1959; Ulrich 2004).

Iran is situated in the southwestern Asian part of the Palaearctic, in relative close proximity of, and influenced by, the Oriental (southeastern Iran) and Afrotropical realms (southwestern Iran). In the case of Diptera, southwestern Iran itself is not regarded as part of the Afrotropical Region (Crosskey 1980). Iran’s territory mainly

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consists of rugged mountain ridges surrounding high altitude interior basins and valleys. Forest steppe dominates the western part of the country, whereas most of the centre, south and southeast of Iran is steppe and desert habitats. Only 7% of the country is covered by forests that are found almost exclusively on the southern slopes rising from the Caspian Sea. These Caspian Hycranian Mixed Forests in the north of Iran have a special and sometimes endemic fauna and flora, which was the main reason to include them in a number of recent surveys conducted in the north and northwest of Iran. In the past, little attention has been drawn to the dolichopodid fauna of this country, and only recently, efforts have been intensified. As a result, 46 species of the subfamily Dolichopodinae have been reported from Iran (Khaghaninia et al. 2013a, b, 2014, Kazerani et al. 2014a, b, c), including a new species (Dolichopus malekii Grichanov, Khaghaninia & Gharajedaghi, 2014) from northwestern Iran (Khaghaninia et al. 2014).

Eleven of the Dolichopodinae collected recently proved new to science and belong to widely distributed Palaearctic genera like Dolichopus, Gymnopterus, Hercostomus, Poecilobothrus and Sybistroma. In this second taxonomic paper dealing with the dolichopodid fauna of western and central parts of northern Iran, eight of the new species are described. Unfortunately the specimens of Sybistroma are in poor condition and new material is required to complete species descriptions and diagnoses.

Material and methods

This study is based on the material collected during two general entomological surveys (Fig. 1). A first survey was conducted in 16 rainforest sites of the Caspian Hycranian Mixed Forests ecoregion in northern Iran (Mazandaran and Guilan provinces), including Sisangan National Forest and Nur Forest Park. In each of the sites, one Malaise trap was installed and operational during one season. Eight sites in the Guilan province were investigated from 24 April until 28 November, 2010 and eight sites in Mazandaran between 29 April and 5 November, 2011. In addition, during a second survey (2012–2014) several biotopes in both West and East Azerbaijan, Ardabil and Kordestan provinces (northwestern Iran) were sampled for insects by sweep nets and the first author focused on the retrieval of Dolichopodidae. Twelve, 22 and 19 collecting events took place in 2012, 2013 and 2014, respectively and in each year collecting started in May and ended in August. Dolichopodid flies were stored and preserved in 75% ethanol solution.

Initially, specimens were identified using Grichanov (2007), Parent (1938), Negrobov & Stackelberg (1974a, b), Negrobov (1977), Pollet (1990), and other separate papers (e.g. Stackelberg 1949; Assis Fonseca 1978; Negrobov & Nechay 2009; Naglis 2011; Khaghaninia et al. 2013b). In early 2014, a representative sample of each species was checked by the last author (MP) and compared against identified European species. In some doubtful cases, holotype specimens were examined to confirm species identifications. The bulk of the specimens are deposited in the Insect Collection of Hasssan Maleki Milani (ICHMM), University of Tabriz, Tabriz (Iran), and in the Insect Collection of the Department of Entomology, Tarbiat Modares University (TMUC), Tehran (Iran). Several specimens have also been deposited in the private collection of Marc Pollet, Belgium (MAPC).

In describing the hypopygium, ‘dorsal’ and ‘ventral’ refers to the morphological position prior to genitalic rotation and flexion. Thus, in the drawings showing a lateral view of the hypopygium, the top is morphologically ventral, while the bottom is dorsal. Biometrics were carried out on body and wing lengths, and relative lengths of wing vein sections and tarsomeres. The latter relative lengths were recalculated so that the shortest leg part represents a value of “1”. CuA₁ ratio is the ratio of the length of the apical section of vein CuA₁ versus that of the crossvein dm-cu. Palpus and proboscis size is compared to the eye size, the eye measured as the vertical diameter (from about ocellar tubercle to the lower eye margin).

The general morphological terminology follows Cumming & Wood (2009), while Brooks (2005) was used for male genitalia. The following abbreviations were used: ac: acrostichal bristles; ad: anterodorsal; ap pm: anterior postpronotal (= humeral sensu Parent 1938); ap: apical; av: anteroventral; av pm: basal postpronotal (= posthumeral sensu Parent 1938); bv: basoventral; dc: dorsoventral bristle pairs; ds: dorsal; MSSC(s): male secondary sexual character(s); npl: notopleural; pal: postalar; pd: posterodorsal; psut ial: presutural intra-alar (= presutural sensu Parent 1938); pv: posteroverentral; S: abdominal sternite; sp: supra-al; sut: sutural intra-alar (= sutural sensu Parent 1938); ta: tarsome; T: abdominal tergite; vt: ventral; I, II, III refers to fore, mid and hind leg; 1–5 in the descriptions of tarsi refers to basal (1) to apical (5) tarsomeres; 1–6 in the descriptions of abdominal segments (tergites/sternites) refers to basal (1) to caudal (6) segments.
Institutional abbreviations: ICHMM: Insect Collection of Hassan Maleki Milani, University of Tabriz, Tabriz, Iran; MAPC: private collection of Marc Pollet, Belgium; MGAB: Museum of Natural History “Grigore Antipa”, Bucharest, Romania; TMUC: Insect Collection of the Department of Entomology, Tarbiat Modares University, Tehran, Iran; ZMHB: Museum für Naturkunde, Berlin, Germany.

Information on the distribution of species was retrieved from Negrobov (1991), Yang et al. (2006), Grichanov (2007) and Pollet (2011).

FIGURE 1. Collection localities of Malaise trap surveys (yellow symbols) and sweep net surveys (pink symbols) in northern Iran. Provinces are delineated by white borders, with provincial name given in yellow.

Systematics

Dolichopus fuscicercus Pollet, Khaghaninia & Kazerani sp. nov. (Figs 2–4, 6)


Diagnosis. Moderate-sized species. Uppermost postoculars black, lower yellow. Antenna largely yellow, with scape and postpedicel partly black. Legs largely yellow, with coxa II and III, apex of tibia III and tarsi largely black. Male: face brilliant pale golden. Cercus rectangular, brown. MSSCs as in D. plumipes (Scopoli, 1763): tibia II flattened, with bare dorsal face, mainly white with elongate brown streak along entire length; tarsomere II strongly plumose; tibia III with pale pollinosity in basal 1/2 on posterior face, and with ciliolarium and small apical tooth. Wing with strongly undulating posterior margin.

Description. Male. Body length: 3.7–3.8 mm; wing length: 3.6 (n=2). Head. Face brilliant pale golden, slightly narrowing towards clypeus, at clypeus about 0.8 x as wide as postpedicel (length), bare. Frons brilliant metallic green, not dusted. Occiput bronze, not dusted, flat. Palpus about 1/10 of eye, circular, yellow, with dark pubescence and 1 black bristle at apex. Proboscis brown. Eye red, with strong green reflection in frontal view, and with short, dense pubescence. About upper half of postocular bristles black, and lower half golden yellow, uniserial. Two to three pairs of black postocular bristles. Antenna (Fig. 2) largely yellow, with scape infuscated on dorsal 1/3 along entire length, and postpedicel yellowish white on basoventral 1/3, otherwise black; postpedicel
rounded triagonal, with rather acute apex, about 1.2 x as long as deep, and 1.3 x as long as scape and pedicel combined; stylus dorsal, inserted at about apical 2/3, rather short, about 1.3 x as long as first three antennal segments combined (2nd article 1.4 x as long as 1st article); 1st article slightly dilated; with microscopic pubescence. **Thorax.** Entirely bronze to dark metallic green, pleura with greyish dusting; scutellum with 2 strong median, and 2 minute lateral bristles, bare on dorsum. With a group of 2–3 minute white setae in front of posterior spiral. Main thoracic bristles black. Six dc, with 5th dc medially off-set; 7 ac, biserial, reaching between 4th and 5th dc, as long as distance between rows; with 1 strong and a few minute ant ppn, 1 internal and 1 external bas ppn, 1 psut ia1, 1 sut ia1, 2 npl, 2 spal, and 1 pal bristles. Upper proepisternum with strong black setae anteriad of anterior spiral, lower proepisternum with 1 strong black bristle, and many yellow setae. **Wing.** Hyaline. Costal vein with small cell. Vein M1+2 smoothly bending towards R1, both slightly converging towards wing apex; hind margin of wing distinctly undulating (MSSC, similar as in *D. plumipes*). Proximal section of M1+2 0.7 x as long as apical section. Proximal section of CuA1 1.4 x as long as apical section. CuA1 ratio 2.2. Halter white, calyptral fringe black. **Legs.** Mainly yellow, with black bristles and pubescence. Coxa I yellow, slightly infuscated laterally on less than basal 1/3; coxa II and III dark metallic green, latter with external bristle inserted at apical 1/3 in middle. Trochanters yellow in leg I, brownish yellow in leg II, and mainly brown in leg III. All femora yellow, with only femur III sometimes brownish dorsally. Femur I with 1 small pv preapical bristle; femur II with 1 strong ad preapical and 1 small pv preapical bristles; femur III with 1 strong ad preapical bristle, and one row of about 7 rather erect ds bristles in less than basal 1/3, about 1/3 x as long as femur is deep. Tibia I yellow, with 2 ad and 2 ds bristles, with basal bristles inserted beyond basal 1/4 and smaller than apical ones, latter about 2 x as long as tibia is deep; with ad serration of short bristles distad of basal ad bristle; with 2 ap bristles on dorsal face; with 3–4 pv bristles, longest about 2 x as long as tibia is wide. Tibia II elongate, strongly flattened, with bare, shining and wrinkled dorsal face; mainly white with yellow basis, with distinct brown streak along entire length (MSSC); with 1 strong basal ad bristle at basal 1/10, about 2 x as long as tibia is deep, and 3 minute ad setae; with 1 rather strong pd bristle at basal 1/5, about 1.5 x as long as tibia is deep, and 1 minute pd bristle near apex; with 5 strong ap bristles. Tibia III yellow with apical 1/5 black, with basal 1/2 and apical 1/5 slightly swollen; posterior face with narrow zone of pale pilosity in basal 1/2, and with short white ciliolarium at apex; with small thin apical hook posteroventrally; with 6 ad and 5 pd bristles, basalmost bristles strongest, longest bristles about 3 x as long as tibia is deep, and with 2 ap bristles; with distinct pd pubescence on apical 2/3; ventrally with row of multiple, thin rather erect bristles on basal 1/2, and 1 strong av bristle at apical 1/3, about 1.5 x as long as tibia is wide. Tarsus I yellow, black from apical 1/5 of tal1, onwards. Tarsus II (Fig. 2) entirely black, with tal1 strongly flattened dorsoventrally, with anterior and posterior row of distinctly flattened black bristles (plumose character) (MSSC). Tarsus III entirely black, talII with 2 strong ds and 1 ad bristle, and 4 smaller ventral bristles. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 6:7/6.8/3.5/1.7/1.4/1.1, in leg II: 8.1/10.3/3.1/1.4/1.1, and in leg III: 7.3/9.1/3.9/3/2.1/1.2/1. **Abdomen.** With 5 pubescent tergites, T5 bare, largely covered by T6. Tergites and S1 concolorous with thorax, with black bristles. S1, rudimentary and S5, white, forming enclosure for hypopygium, with sparse minute pale pubescence. Hypopygium (Figs 3–4, 6) with epandrium bronze to dark metallic green; hypandrium blackish brown, short, straight; phallus reddish yellow, narrow, rather straight; left bv epandrial lobe distinctly stronger than right lobe, hook-like; apv epandrial lobe rather quadrate, dark brown, with two pale setae; cercus moderate-sized, rectangular, brown with strong curved bristles on tubercles on apical margin. **Female.** Body length: 4.1 mm; wing length: 3.7 mm (n=1). As male, except for the following features: face greyish, at clypeus about 1.4 x as wide as postpedicel is long, with clypeus slightly bulging. Antenna with postpedicel about as long as deep, and 0.9 x as long as scape and pedicel combined; stylus rather short, about 1.4 x as long as first three antennal segments combined (2nd aristomere 2.4 x as long as 1st aristomere). Wing without undulating posterior margin. Proximal section of M4, 0.9 x as long as apical section. Proximal section of CuA1 1.6 x as long as apical section. CuA1 ratio: 2.0. Abdomen with T1 entirely covered by T2; sternites dark metallic green with short dense black pubescence. Legs with coxa I yellow, slightly infuscated on basal 1/2, mainly laterally. Femur I with 1–2 small pv preapical bristles; femur III without small preapical bristles. Tibia I with 2 pv bristles, longest about 1.5 x as long as tibia is wide, sometimes with 1 small av bristle; tibia II brownish yellow with extreme apex black, with 4 strong ad and 2 strong pd bristles, basal bristles inserted at basal 1/5; with 1 av bristle at apical 1/3, all bristles on tibia II about 3 x as long as tibia is wide; tibia III yellow, gradually darker towards apex, with apical 1/3 black; sometimes with one additional small av bristle. Tarsus I yellow at extreme basis, gradually darker towards apex, with apical 1/4 black; tarsus II entirely black, all tarsomeres with...
short inclined ventral bristles along entire length. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 8/8/3.8/1.8/1.3/1/1.2, in leg II: 7.8/9.2/4/2.1/1.5/1/1, and in leg III: 7/8.8/3.1/2.9/2/1.3/1.

FIGURES 2–5. Dolichopus fuscicercus sp. nov., male: (2) habitus; (3) hypopygium; (4) cercus. Dolichopus plumipes, male: (5) hypopygium.
FIGURE 6. *Dolichopus fuscicercus* sp. nov., male, hypopygium (scale 0.5 mm) and appendages (scale 0.1 mm). Abbreviations: apv lobe: apicoventral epandrial lobe, bv lobe: basoventral epandrial lobe, cerc: cercus, dsur: dorsal surstylar lobe, hyp: hypandrium, ph: phallus, vsur: ventral surstylar lobe.

**Type material.** HOLOTYPE ♂, IRAN: East Azerbaijan, Arasbaran, Chichekli (forest), 38°30.437′N, 46°36.447′E, 1724 m, 25.vi.2013, SW, leg. Samad Khaghaninia (ICHMM). PARATYPES: IRAN: 1♀, same data as holotype; 4♂, 2♀, East Azerbaijan, Kandovan (grassland), 37°44.200′N, 46°18.001′E, 3090 m, 28.vii.2014, SW, leg. S. Khaghaninia (ICHMM); 3♂, 3♀, East Azerbaijan, Kandovan (grassland), 37°44.001′N, 46°19.010′E, 3000 m, 28.vii.2014, SW, leg. S. Khaghaninia (TMUC); 5♂, 4♀, East Azerbaijan, Kandovan (grassland), 37°46.10′N, 46°16.001′E, 2500 m, 15.vi.2013, SW, leg. S. Khaghaninia (ICHMM); 2♂, 1♀, East Azerbaijan, Kandovan (grassland), 37°44.254′N, 46°19.256′E, 3005 m, 6.vii.2013, SW, leg. S. Khaghaninia (ICHMM); 1♂, East Azerbaijan, Arasbaran, Keleybar (forest), 38°51.548′N, 46°59.007′E, 1783 m, 1.vii.2013, SW, leg. S. Khaghaninia (MAPC) (latter record, see also Kazerani et al. 2013).

**Distribution and ecology.** Thus far, the species has only been encountered in the East Azerbaijan province of Iran. It has been collected both in grasslands between 2500 m and 3090 m and forest habitats below 1800 m, but in fair numbers only in grasslands, a habitat also preferred by *D. plumipes*. In fact, previously *D. fuscicercus* sp. nov. was erroneously recorded as *D. plumipes* from Iran by Kazerani et al. (2013).

**Etymology.** The species name “fuscicercus” refers to the uniformly brown cercus (Figs 2–4, 6), which is only found in a few *Dolichopus* species (e.g., *D. apicalis* Zetterstedt, 1849 and *D. campestris* Meigen, 1824), whereas most species feature a white cercus with a dark margin (Fig. 5).

**Remarks.** *Dolichopus fuscicercus* clearly belongs to the *D. plumipes* species group (Germann et al. 2010; Pollet et al. 2010; Khaghaninia et al. 2013b), and features two MSSCs that are found in other species of this group.
the undulating posterior wing margin and the plumose mid tarsus. It differs from two other Palaeartic species with a plumose mid tarsus, *D. polleti* Meuffels & Grootaert, 1989 and *D. wahlbergi* Zetterstedt, 1843 by the presence of a brown streak on the mid tibia, and the hind tibia with a dark apex (entirely pale in both other species). *Dolichopus plumipes* is mainly Holarctic in distribution, with extensions into the Neotropics and Oriental realms. MP has examined *D. plumipes* from all over Europe and Canada, and checked pictures of *D. plumipes* from China (Sichuan; Xizang (Tibet)). None shared the hypopygial features found in *D. fuscicercus*. Sequencing with COI barcodes and/or other markers could provide evidence on the identity and relationship of *D. fuscicercus* with *D. plumipes*, but this has not been possible thus far. *Dolichopus fuscicercus* can be most easily distinguished from the third species with a plumose mid tarsus, *D. plumipes*, as follows:

1 Smaller species (male body length less than 4.0 mm). Cercus rather rectangular and uniformly brown; apicoventral epandrial lobe dark brown (Fig. 3). Postpedicel of antenna rounded triangular, 1.2 x as long as deep. Hind tibia pale yellow with apical 1/5 black. 

- Larger species (male body length more than 4.0 mm). Cercus ovoid, white with black margin; apicoventral epandrial lobe pale yellow (Fig. 5). Postpedicel of antenna rather ovoid, 1.7 x as long as deep. Hind tibia pale yellow with at most apical 1/8 black.

### Dolichopus subimmaculatus Kazerani, Pollet & Khaghaninia sp. nov.

(Figs 7–9)


**Diagnosis.** Moderate-sized dark species. Antenna and legs entirely black, with only tarsi I–II paler at extreme basis. Upper postocular bristles black, central ones white and lowermost black. Male: face coppery brown. Cercus rounded triangular, whitish with brown tinge and dark margin. Distinct MSSCs lacking.

**Description.** **Male.** Body length: 4.6 mm; wing length: 3.9 mm (*n*=1). **Head.** Face coppery brown, parallel-sided, at upper edge of clypeus 0.8 x as wide as postpedicel (length), bare. Frons bronze, dusted. Occiput bronze, slightly convex. Palpus very small, less than 1/10 of eye, ovoid, black, with rather long, black pubescence and 1 strong, black apical bristle. Proboscis brownish yellow. Eyes red, with very short yellow pubescence. Upper postocular bristles black, central ones (5) white and lowermost (4) black. Three-four pairs of black postocular bristles. Antenna entirely black, with postpedicel triangular with rather acute apex, 1.3 x as long as deep and as long as scape and pedicel combined; stylus dorsal, inserted at about apical 1/3, 1.3 x as long as first three antennal segments combined, nearly bare. **Thorax.** Entirely metallic green, pleura with greyish dusting; scutellum with 2 strong median and 2 very small, curved lateral bristles, with distinct fringe of pale setae, and only a few on disk. With group of 3 minute setae in front of posterior spiracle. Main thoracic bristles black. Six dc, with 5th dc medially off-set; 12 biserial ac, reaching almost to level of 5th dc, 2 x as long as distance between rows; with 1 strong and 2 minute ant pprn, 1 internal and 1 external bas pprn, 1 psut ial, 1 sut ial (smaller than dc), 2 npl, 2 spal, and 1 pal bristles. Upper proepisternum with rather long, pale setae, and lower proepisternum with 1 strong erect black bristle and group of rather long pale setae at base. **Wing.** Very slightly and evenly infuscate. Vein *R* 4+5 slightly curved at apex, *M* 1+2 strongly curved in about apical 1/3, *R* 4+5, and *M* 1+2 parallel near wing apex. Proximal section of *M* 1+2 as long as apical section. Proximal section of *CuA* 1.7 x as long as apical section. *CuA* 4 ratio: 2.3. Halter white, calyptral fringe black. **Legs.** Entirely dark brown to black, including coxae and trochanters, with black bristles. Coxa III with external bristle, inserted at about middle. Femur I with 1 small pv preapical bristle; femur II with 1 strong ad preapical bristle, and 1 smaller pv preapical bristle; femur III with 1 ad preapical bristle, with one row of short inclined av bristles and with one row of short ds bristles in basal 1/2, about 0.5 x as long as femur is deep. Tibia I with 2 ad and 2 pd bristles, with smaller basalmost pair at about basal 1/4, apicalmost bristles about 3 x as long as tibia is deep, and with ad serration of short black bristles on apical 3/5, not as long as tibia is deep; with 2 pv bristles, about 1.5 x as long as tibia is deep; with 1 strong and 2 thin ap bristles. Tibia II with 5 ad bristles inserted in basal 2/3, about 3.5 x as long as tibia is deep, basalmost bristle smaller; with 2 pd bristles, inserted at about basal 1/5 and 3/5, about 4 x as long as tibia deep; with 5 very strong ap bristles; with 1 strong av bristle at apical 1/3, about 4 x as long as tibia. Tibia III with 5 ad and 5 pd, about 3 x as long as tibia is deep, with basalmost
bristle pair shorter; with 2 ap bristles, and distinct pd row of bristles on apical 1/2; with row of short vt bristles, not as long as tibia is deep, and 1 strong vt bristle at apical ¼, about 3 x as long as tibia is deep; with pd tooth at extreme apex, articulating with small tooth on tIII1. Tarsi I–II black with tI1 and tII1 yellowish at extreme basis; tIII, with 2 ds bristles. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 8.3/7.7/4.3/1.7/1.2/1.1, in leg II: 5.2/6.9/4.2/2.4/1.7/1.1, and in leg III: 4.3/6.0/3.2/2.8/2.1/1.2/1. **Abdomen.** With 5 pubescent segments, T6 bare, about 0.7 x as long as T5. Tergites bronze. Bristles black. S2–4 metallic green, with short pale pubescence. Hypopygium with brownish black epandrium; hypandrium brown, elongate triangular, slightly asymmetrical; apv epandrial lobe with rounded quadrate apex, with 1 strong bristle at ventral margin and 2 small bristles at apex; cercus moderate-sized, rounded triangular, whitish with brown tinge and with dark margin, with strong curved bristles on tubercles at ventral and caudal margin. **Female.** Body length: 4.8 mm; wing length: 4.2 mm (n=1). As male, except for the following features: face at clypeus about 1.3 x as wide as postpedicel is long. Antenna with postpedicel about as long as deep, and 0.8 x as long as scape and pedicel combined. Abdomen with T6 entirely

**FIGURES 7–9.** Dolichopus subimmaculatus sp. nov., male. (7) habitus; (8) head; (9) hypopygium.
covered by T₃, sternites with short dense black pubescence. Legs entirely black, only femora yellow at extreme apex and tarsi I–II at extreme basis. Tibia I with longest pv bristle about 2 x as long as tibia is wide, and with 2 small av bristles; tibia II with bristles 2.5 x as long as tibia is wide. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 9.7/8.4/7.1/1.7/1.2/1.1, in leg II: 5.8/8.6/4.5/2.3/1.6/1.2/1, and in leg III: 6.2/7.2/3.5/3.1/2.2/1.2/1.

**Type material.** **HOLOTYPE** ♂, **IRAN:** East Azerbaijan, Arasbaran, Chichhekli (forest), 38°39.899′ N, 46°31.248′E, 2140 m, 15.vi.2013, SW, leg. S. Khaghaninia (ICHMM). **PARATYPES:** **IRAN:** 1 ♂, 1 ♀, same data as holotype; 2 ♀, East Azerbaijan, Arasbaran, Chichhekli (forest), 38°30.437′N, 46°36.447′E, 1724 m, 25.viii.2012, SW, leg. S. Khaghaninia (TMUC); 1 ♂, same data (MAPC); 6 ♂, 4 ♀, East Azerbaijan, Qurigol (wetland), 37°54.736′N, 46°41.617′E, 1928 m, 5.vii.2013, SW, leg. S. Khaghaninia (ICHMM). **ISRAEL:** 1 ♂, 3 ♀, Golan Heights, Birket-Bab (Hana), 8.v.1995, leg. V. Gheorghiu (MGAB).

**Distribution and ecology.** Thus far, this species has only been collected in the East Azerbaijan province of Iran, both in forest and wetland habitats. It was previously erroneously recorded as *D. immaculatus* Becker, 1909 from East Azerbaijan (Iran) by Kazerani *et al.* (2013) and Khaghaninia *et al.* (2014), and from Israel by Parvu (1996).

**Etymology.** The name "*subimmaculatus*" refers to the close resemblance of this species with *D. immaculatus*, the holotype (in ZMHB) of which has been examined by us.

**Remarks.** Both the keys of Parent (1938) and Stackelberg (1930) are problematic for this species due to the unusual arrangement of pale postocular bristles which are situated between black uppermost and lowermost postoculars. In the key to *Dolichopus* (*Leucodolichopus* Frey) (Stackelberg 1930) this species leads to *Dolichopus perversus* Loew, 1870. Though the latter species shares the mixed arrangement of postoculars with *D. immaculatus*, it differs from it by its smaller posture, a posterior paler zone on (at least) femur I, and the smaller cercus with marginal peduncles at regular intervals. Ignoring the central yellow bristles in the key to *Dolichopus* (*Melanodolichopus* Frey), the species eventually keys to *D. immaculatus*, from which it can be separated as follows:

| 1 | Uppermost and lowermost postocular bristles black, central ones yellow. Face coppery brown. Cercus (Fig. 9) rounded triangular, whitish with brown tinge and dark margin, with strong curved bristles on tubercles at ventral and caudal margin. Postpedicel (Fig. 8) triangular with rather acute apex. Tibia I with 2 pv bristles, 1.5 x as long as tibia is deep. | Dolichopus subimmaculatus sp. nov. (Iran, Israel) (Fig. 7) | - All postocular bristles black. Face grey with brownish tinge. Cercus (Fig. 11) trapezoid, brownish with broad apical darker margin, with 1 tubercle bearing flattened bristles and one separate flattened bristle at apicodorsal margin. Postpedicel subcircular with blunt apex. Tibia I with 1 pv bristle at about basal 1/3, 3 x as long as tibia is deep. | Dolichopus immaculatus (Europe) (Fig. 10) |

**Gymnopternus atratus** Pollet, Khaghaninia & Kazerani sp. nov. (Figs 12–14)

**Diagnosis.** Male. Rather small robust dark species. Face greyish white. All postocular bristles black. Antenna entirely black with postpedicel as long as deep, triangular with rather acute apex. Wing slightly infuscate. Legs including coxae and trochanters entirely black except for extreme apex of femur I–III. Hypopygium rather robust with dark appendages; cercus black, club-shaped and relatively narrow. Distinct MSSC's lacking.

**Description.** **Male.** Body length: 2.8 mm; wing length: 2.9 mm (n=1). **Head.** Face greyish white, slightly narrowing below antenna, at middle parallel-sided; epistoma with shallow central furrow, at clypeus 0.7 x as wide as postpedicel is long; clypeus retracted, bare. Frons dark metallic green, only slightly dusted. Occiput dark metallic green, rather convex. Palpus very small, less than 1/10 of eye, circular, black, with dark pubescence and 1 black apical bristle. Proboscis brown. Eyes red, with green reflection in frontal view, with short dense pubescence. All postocular bristles black. Three pairs of black postocular bristles. Antenna entirely black, with postpedicel triangular, as long as deep and 1.2 x as long as scape and pedicel combined (pedicel overlapping dorsal edge of postpedicel), with rather acute apex; stylus dorsal, inserted at about apical 1/3, rather short, about 1.5 x as long as first three antennal segments combined, with microscopic pubescence. **Thorax.** Entirely dark metallic green, pleura dusted greyish; scutellum with 2 strong median, 2 minute lateral bristles and a dense black pubescence on disk and margin. A group of 3–4 short setae in front of posterior spiracle. Thoracic bristles black. Six dc, with 5th dc medially off-set; about 10–12 ac, biserial, reaching 6th dc, there with additional ac-sized bristles laterad of ac...
FIGURES 10–11. Dolichopus immaculatus, holotype. (10) habitus; (11) hypopygium.
FIGURES 12–13. Gymnopternus atratus sp. nov., holotype. (12) habitus; (13) hypopygium (scale 0.5 mm).

rows, ac about 1.5 x as long as distance between rows; 1 strong and a few minute ant pprn, 1 internal and 1 external bas pprn, 1 psut ial, 1 equal-sized sut ial, 2 npl, 2 spal, and 1 pal bristles. Upper proepisternum with a few black setae, lower proepisternum with 1 strong black bristle, with many black setae. **Wing.** Slightly infuscate. Vein R₄+₅
slightly curved, M₁₋₂ rather straight, both slightly converging towards wing apex, parallel at apex. Proximal section of M₁₋₃, 0.9 x as long as apical section. Proximal section of CuA₁, 1.8 x as long as apical section. CuA₁ ratio: 1.8. Halter white, clyphteral fringe black. **Legs.** Nearly entirely blackish brown, including coxae and trochanters, except for extreme apex of femur I–III. Bristles black. Coxa III with 1 strong external bristle, inserted at about centre. Femur I with extreme apex brownish, and with 3 small pv preapical bristles; femur II with extreme apex yellowish, with 1 strong ad and 1 smaller pv preapical bristles; with one av and one pv row of short indistinct inclined bristles along entire length; femur III with extreme apex yellowish; with 1 strong ad bristle at about apical ¼, and with one row of about 6 rather erect ds bristles on basal 1/3, less than 1/3 as long as femur is deep. Tibia I with extreme basis brownish, with 1 ad bristle at basal 1/3 and ad serration of black bristles on apical 2/3, about as long as tibia is deep; with 2 ds (or pd) bristles, at basal 1/3 and 1/2, longest one 2 x as long as tibia is deep. Tibia II with extreme basis brownish, with 3 strong ad and 2 strong pd bristles, between 2.5–3 x as long as tibia is deep, with basal bristle pair inserted at basal 1/5; with 1 av bristle at apical 2/5, about 3 x as long as tibia is deep; with 5 (4 large, 1 small) ap bristles. Tibia III blackish brown, with apical tooth on posterior face, articulating with small hook on taliII; with 3 ad and 3 pd bristles, about 2.5–3 x as long as tibia is deep; with pd serration on less than apical 2/5, and 3 large ap bristles, incl. one preapical ad bristle; with rather distinct pd row of bristles, especially on apical 2/3; with 1 ventral bristle at apical 1/3, about 2 x as long as tibia is deep. All tarsi black; taliI, with some strong ventral bristles, about as long as taliIII, is deep; with small hook at extreme basis on posterior face. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 8.5/8.8/4.5/1.5/1.3/1.3, in leg II: 7.8/8.8/3.9/1.9/1.4/1.1, and in leg III: 2.9/3.4/1.1/-/-/- (tarsomeres III₄ lacking). **Abdomen.** With 5 pubescent tergites, T₅ bare, visible, about 0.6 x as long as T₄. Tergites and S₅ dark metallic green, with black bristles. S₃ rudimentary and S₄₃ white, forming enclosure for hypopygium, with dense, black pubescence. Hypopygium rather robust, with blackish brown, straight hypandrium, parallel-sided in ventral view; apicoventral epandrial lobe (Fig. 14) blackish brown with paler basis and triangular process near basis; cercus black, club-shaped and rather narrow, with apical margin nearly straight; apical and ventral margin with dark bristles. **Female.** Unknown.  

**Type material.** HOLOTYPE ♂, IRAN: West Azerbaijan, Kho (montane grassland), 38°34.220'N, 44°50.896'E, 1305 m, 10.vi.2014, SW, leg. Samad Khaghaninia (ICHMM).

**Distribution and ecology.** The holotype is the only representative of this species (see above).

**Etymology.** The species name “atratus” refers to the overall dark coloration of the species.

**Remarks.** Only two of the 10 European Gymnopternus species (Pollet 1990; Pollet & Rampazzi 2003) have black femora, namely G. cupreus (Fallén, 1823) and G. flavitibia. In the key by Pollet (1990), both G. flavitibia Pollet, Khaghaninia & Kazerani sp. nov. and G. atratus sp. nov. would run to G. flavitibia, an equal-sized species with the same coloration as G. flavitibia. The three species can be separated as follows (none of the other dark-legged Palaeartic and Chinese Gymnopternus species proved conspecific to either of the new species, based on the shape of the hypopygic appendages):

**Males**

1. Legs (Fig. 12) entirely black. Cercus (Fig. 13) entirely black, rather narrow, about 1.5x as long as wide at middle ........................................ G. atratus sp. nov. (Iran)

   - Tibia I and II nearly entirely yellow, tibia III distinctly infuscate at apex. Cercus wider, about as long as deep ........................................ 2

2. Postpedicel subcircular. All tibiae (Fig. 15) with extreme base distinctly infuscate. Hypopygium (Fig. 17) larger and more robust, ovoid. Hypandrium (Fig. 18) longer, slightly tapering and truncated at apex in ventral view. Apicoventral epandrial lobe stouter, dark brown with white basis, and short, more abrupt apical bend. Cercus black, club-shaped, with distinct apical indentation. ........................................ G. flavitibia sp. nov. (Iran)

   - Postpedicel ovoid. Tibiae with pale base, at most slightly infuscate in tibia III. Hypopygium smaller, with epandrium rather quadrate. Hypandrium (Fig. 19) rather short, tapering towards apex in ventral view. Apicoventral epandrial lobe rather long and slender, brownish yellow with white basis, bending gently at apex. Cercus dark brown, roundish club-shaped, with hardly any indentation in apical margin. ........................................ G. angustifrons (Palaeartic, incl. eastern Russia and Kazakhstan)

**Females**

1. Clypeus entirely bare. All tibiae with extreme base distinctly infuscate. ........................................ G. flavitibia sp. nov. (Iran)

   - Clypeus with dense black pubescence. Tibiae with pale bases, at most slightly infuscate in tibiae III ........................................ G. angustifrons (Staeger, 1842) (Palaeartic, incl. eastern Russia and Kazakhstan)
FIGURE 14. Gymnopternus atratus sp. nov., holotype, hypopygium (scale 0.5 mm) and hypopygial appendages (scale 0.1 mm). Abbreviations: apv lobe: apicoventral epandrial lobe, cerc: cercus, dsur: dorsal surstylar lobe, hyp: hypandrium.

Gymnopternus flavitibia Pollet, Khaghaninia & Kazerani sp. nov.  
(Figs 15–18)

Gymnopternus angustifrons Kazerani et al., 2015: 25, not Staeger, 1842: 44.

Diagnosis. Rather small, robust species. Face greyish white. All postocular bristles black. Antenna entirely black with postpedicel as long as deep, subcircular with blunt apex. Wing slightly infuscate. Legs with coxae and femora dark, tibiae I–III yellow with extreme basis infuscate, with tibia III also with darkened apex; tarsi mainly dark. Male. Hypopygium rather robust, with stout dark apicoventral epandrial lobe and black club-shaped cercus with apical indentation. Distinct MSSCs lacking.

Description. Male. Body length: 2.8–3.0 mm; wing length: 3.0–3.1 mm (n=3). Head. Face greyish white, slightly narrowing below antenna, parallel-sided at middle, at clypeus 0.7 x as wide as postpedicel is long; epistoma with shallow central furrow and a few dark setae, clypeus retracted, bare. Frons dark metallic green, only slightly dusted. Occiput dark metallic green, rather convex. Palpus very small, less than 1/10 of eye, circular, black,
with dark pubescence and 1 black apical bristle. Proboscis brown. Eyes red, with green reflection in frontal view, with short and dense pubescence. All postocular bristles black. Three pairs of black postocular bristles. Antenna entirely black, with postpedicel subcircular with blunt apex, as long as deep, and 1.2 x as long as scape and pedicel combined (pedicel overlapping dorsal edge of postpedicel); stylus dorsal, inserted at about apical 1/3, about 1.5 x as long as first three antennal segments combined, with microscopic pubescence. **Thorax.** Entirely dark metallic green, pleura dusted greyish; scutellum with 2 strong median and 2 minute lateral bristles, and dense black pubescence on disk and posterolateral margin. Group of 3–4 minute setae in front of posterior spiracle. Thoracic bristles black. Six dc, with 5th dc medially off-set; about 10–12 ac, biserial, reaching 6th dc, there with additional ac-sized bristles laterad of ac rows, ac about 1.5 x as long as distance between rows; 1 strong, and a few minute ant pprn, 1 internal and 1 external bas pprn, 1 psut iai, 1 equal-sized sut iai, 2 npl, 2 spal, and 1 pal bristles. Upper proepisternum with a few black setae, lower proepisternum with 1 strong black bristle and many black setae. **Wing.** Slightly infuscate. Vein R,, slightly curved, M,; rather straight, both slightly converging towards wing apex, and parallel at apex. Proximal section of M,; 0.9 x as long as apical section. Proximal section of CuA, 1.8 x as long as apical section. CuA ratio: 1.8. Halter white, calyptral fringe black. **Legs.** All coxae and femora blackish brown, tibiae entirely or mainly yellow, and tarsi mainly black. Bristles black. Coxa III with 1 strong external bristle, inserted at about centre. Trochanters brown in leg I, and brownish yellow in legs II–III (paler than femur). Femur I with extreme apex yellow; femor II with less than apical 1/10 yellow, with 1 strong ad and 1 small pv preapical bristles; with 1 av and 1 pv row of short indistinct inclined bristles along entire length; femur III with extreme apex yellow; with 1 strong ad preapical bristle, at about apical 1/4; with 1 row of about 6 rather erect ds bristles on basal 1/3, about 1/2 as long as femur is deep. Tibia I yellow to brownish yellow, with extreme basis whitish with a brown ring in basal 1/5, with 1 ad bristle at basal 1/3, and ad serration of black bristles on apical 2/3, about as long as tibia is deep; with 2 ds (or pd) bristles, at basal 1/3 and 1/2, longest 2 x as long as tibia is deep. Tibia II yellow with extreme basis brown, with 3 strong ad and 2 strong pd bristles, 2.5–3 x as long as tibia is deep, with basalmost bristle pair at basal 1/5; with 1 av bristle at apical 2/5, about 3 x as long as tibia is deep; with 5 (4 large, 1 small) ap bristles. Tibia III yellow to brownish yellow, with about basal 1/10 and apical 1/3 dark brown; with apical tooth on posterior face, articulating with small hook on tαIII; with 3 ad and 3 pd bristles, about 2.5–3 x as long as tibia is deep; with pd serration on less than apical 2/5, and 3 large ap bristles, incl. one preapical ad bristle; with rather distinct pd row of bristles, especially on apical 2/3; with 2 vt bristles, apicalmost stronger, 2.5 x as long as tibia is deep. Tarsus I yellow, black from about apical 1/4 of tα, onwards; tarsus II yellow, black from about apical 1/3 of tα, onwards; tarsus III entirely black, tαIII with some strong ventral bristles, two about as long as tαIII, is deep, and with small hook at extreme basis on posterior face. Length ratios of femur/tibia/tarsomer 1–5 in leg I: 8.7/8.8/4.5/1.8/1.3/1.3, in leg II: 7.4/8.3/3.7/2.1/1.4/1.1, and in leg III: 7.2/8.7/2.9/1.8/1.3/1.1. **Abdomen.** With 5 pubescent tergites, T1 bare, visible, about 0.6 x as long as T2. Tergites and S1 dark metallic green, with black bristles, rather erect and long on S2, S3 rudimentary and S4a white, forming enclosure for hypopygium, with dense, black pubescence. Hypopygium rather robust, ovoid. Hypandrium rather long, slightly tapering and truncated at apex in ventral view. Apv epandrial lobe more stout, dark brown with white basis, and short, more abrupt apical bend. Cercus black, club-shaped, with distinct apical indentation. **Female.** Body length: 2.7–3.0 mm (n=2); wing length: 3.0 mm (n=1). As male, except for the following features: face parallel-sided, somewhat widened at clypeus, there 1.8 x as wide as postpedicel is long; clypeus somewhat bulging. Antenna: postpedicel about as long as first three antennal segments combined. Thorax: 5 pubescent tergites, and T8 entirely enclosed in T7; sternites dark metallic green, with short black pubescence. Legs: tibia III without apical tooth, with 4 ap bristles, comprising 3 large and one preapical ad bristle; tα, with small ventral bristle at basis; tαIII, without small hook at basis. Length ratios of femur/tibia/tarsomer 1–5 in leg I: 8.8/8.7/4.2/1.7/1.2/1.3, in leg II: 8.1/9.3/9.1/9.3/1.2/1.1, and in leg III: 7.8/6.2/4.2/5.0/1.8/1.2/1.

**Type material.** HOLOTYPE ♂, IRAN: East Azerbaijan, Arasbaran, Keleybar (forest), 38°51.920′ N, 46°49.886′ E, 1675 m, 15.vi.2014, SW, leg. Samad Khaghaninia (ICHMM). PARATYPE: IRAN: 7 ♂, 6 ♀, West Azerbaijan, Khoi (montane grassland), 38°34.220′ N, 44°50.896′ E, 1305 m, 10.vi.2014, SW, leg. S. Khaghaninia (ICHMM); 2 ♂, 2 ♀, same data (MAPC); 1 ♂, West Azerbaijan, Urmia (grassland), 37°51.678′ N, 44°58.388′ E, 1602 m, 17.v.2014, SW, leg. S. Khaghaninia (ICHMM); 3 ♂, 1 ♀, East Azerbaijan, Xumarlu (steppe—forest—grassland), 39°00.277′ N, 46°54.238′ E, 775 m, 20.vi.2014, SW, leg. S. Khaghaninia (ICHMM); 2 ♂, East Azerbaijan, Xumarlu (steppe—forest—grassland), 38°59.059′ N, 46°53.425′ E, 1167 m, 10.vii.2014, SW, leg. S. Khaghaninia (TMUC);
4♂, East Azerbaijan, Arasbaran, Aynali (forest), 38°53.650′N, 46°46.819′E, 1227 m, 10.vii.2014, SW, leg. S. Khaghaninia (ICHMM); 1♀, same data as holotype; 1♂, East Azerbaijan, Arasbaran, Keleybar (forest), 38°51.548′N, 46°59.007′E, 1783 m, 1.vii.2013, SW, leg. S. Khaghaninia (ICHMM); 1♂, same data (MAPC); 4♂, 1♀, East Azerbaijan, Shabestar (grassland), 38°13.060′N, 45°47.254′E, 1634 m, 27.v.2013, SW, leg. S. Khaghaninia (ICHMM).

**Distribution and ecology.** *Gymnopternus flavitibia* sp. nov. has hitherto been encountered in the East and West Azerbaijan provinces of Iran, and seems to occur in different habitat types between 700 m and 1800 m with the largest sample collected in montane grasslands. All specimens were recorded from the end of May until the first half of July. Previously, this species was erroneously recorded from Iran as *G. angustifrons* (Staeger, 1842) by Kazerani *et al.* (2015).

**Etymology.** *Gymnopternus flavitibia* sp. nov. differs from the other black-legged Iranian *Gymnopternus* by its yellow tibiae, hence its name. The species features otherwise no unique MSSCs.

**Remarks.** See under *Gymnopternus atratus* sp. nov.

**FIGURES 15–17.** *Gymnopternus flavitibia* sp. nov., male. (15) habitus: (16) antenna: (17) hypopygium.
FIGURES 18–19. Gymnopternus flavitibia sp. nov., male: (18) hypopygial appendages (scale 0.1 mm). Gymnopternus angustifrons: (19) hypopygial appendages (scale 0.1 mm). Abbreviations: apv lobe: apicoventral epandrial lobe, cerc: cercus, dsur: dorsal surstylar lobe, hyp: hypandrium, vsur: ventral surstylar lobe.
**Hercostomus albicoxa** Pollet & Kazerani sp. nov.  
(Figs 20–22)


**Diagnosis.** Male. Moderate-sized rather robust species. Face silvery white. Uppermost postoculars black, lower yellow. Antenna mainly reddish yellow with postpedicel triangular, 1.2 x as long as wide, with apical ½ brown. Legs nearly entirely whitish yellow including coxae; only coxa II with a distinct spot on lateral face and apical tarsomeres infuscate. Hypopygium large and robust, with epandrium blackish brown, slightly projecting beyond abdomen posteriorly; hypandrium elongate triangular, symmetrical, reddish yellow on ventral face, transparant on sides; cercus moderate-sized, circular, white with broad black apical margin, with thin black outer and thin yellow inner curved bristles on margin. Distinct MSSCs lacking.

**Description.** **Male.** Body: 4.1 mm; wing length: 3.7 mm (n=1). **Head.** Face silvery white, with shallow furrow along entire length, slightly narrowing below antennae, parallel-sided at clypeus, at narrowest width about 0.8 x as wide as postpedicel (length), bare. Frons metallic green, strongly dusted whitish. Occiput metallic green, slightly convex. Palpus rather small, about 1/6 of eye, rounded ovoid, reddish yellow, with less than basal 1/2 dark brown, with black pubescence and 1 strong black apical bristle. Proboscis brownish yellow. Eyes red, with green reflection.

**Thorax.** Mesonotum entirely metallic green, bluish green on dorsum; pleura metallic green, with small yellow spot posteriad of coxa I, and yellow zone dorsal of coxa II, with greyish dusting; scutellum bronze, metallic green in centre, with 2 large median and 2 smaller, thin lateral bristles, bare on dorsum. Thoracic bristles black. Six dc: 9 strong ac, biserial, reaching beyond 5th dc, at least 2.5x as long as distance between rows; 1 large and at least one minute ant pprn, 1 internal and 1 external bas pprn, 1 psut ial, 1 equal-sized sut ial, 2 npl, 2 spal, and 1 pal bristles. Upper proepisternum with 2 black minute setae, and sparse pubescence of pale minute setae, lower proepisternum with 1 strong black bristle and a group of thin pale setae. **Wing.** Hyaline, very slightly and evenly infuscate. Vein R₄₋₅ slightly curved, M₁₋₂ with smooth but distinct bend, both converging towards wing apex, parallel at apex. Proximal section of M₁₋₂ as long as apical section. Proximal section of CuA 2.3 x as long as apical section. CuA₄ ratio: 1.8. Halter white, calyptral fringe black. **Legs.** Nearly entirely whitish yellow including coxae, with only coxa II with brown spot on lateral face and apical tarsomeres infuscate. Bristles black. Coxa II whitish yellow, with brown spot on basal 1/2 on lateral face, with some erect bristles at basis on anterior face. Coxa III with black external bristle, inserted at middle. Femur I with 1 small but distinct pv preapical bristle. Femur II with 1 ad and pv preapical bristles, latter nearly as strong as ad bristle. Femur III with one strong ad preapical bristle at apical ¼, and with short inclined ds bristles in basal 1/2. Tibia I with 2 ad bristles at about basal 1/4 and 1/3, and 2 pd bristles at about basal 1/4 and beyond 1/2, with basalmost pair smaller, and strongest bristles 3 x as long as tibia is deep; with strong ad serration on apical 2/3, not as long as tibia is deep; with 3 ap bristles (incl. 1 pd bristle). Tibia II with 4 strong ad and 3 strong pd bristles, with basalmost pair distinctly smaller, strongest bristles 4.5 x as long as tibia is deep; with 5 equally strong ap bristles; with 1 strong av bristle at 1/2, about 4.5 x as long as tibia is deep, and 1 smaller pv bristle at apical 1/3, 3 x as long as tibia is deep. Tibia III with 4 strong ad and 5 strong pd (incl. 1 preapical ds bristle), with basal pair distinctly smaller, most bristles 4.5 x as long as tibia is deep; with pd serration and distinct pd pubescence about apical 1/3; with 1 av bristle at apical 1/3, and 3 rather erect bristles in basal 3/5, all 1.5 x as long as tibia is deep; with 2 strong and 1 smaller ap bristles. Tarsus I hardly infuscate towards apex. Tarsus II gradually infuscate towards apex, with tal₁₀ brown; talII, with some short vt bristles. Tarsus III darker than t₅–II, gradually infuscate towards apex, with talII 1 x dark brown; talIII 1 x with dense ventral pubescence, some basal bristles on talII, about 1.5 x as long as talII, is deep; talIII, with brown crescent-shaped tooth at extreme basis posteriorly. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 9.5/9.5/5/2.1/1.5/1.1/3, in leg II: 8.2/9.2/4.2/6.2/2.2/1.6/1, and in leg III: 6.6/7.8/2.5/3/1.2/5/1.6/1. **Abdomen.** With 5 pubescent segments, T₅ short, brown, about 0.4 x as long as T₄. Tergites greenish bronze, with strong black bristles on posterior margin. Sternites S₂₄ dark brown, unmetallic, with sparse, short pale pubescence, only S₅ with some short black setae at upper margin. Hypopygium
with epandrium blackish brown, slightly projecting beyond abdomen posteriorly; hypandrium elongate triangular, symmetrical, reddish yellow on ventral face, and transparent on sides; bv epandrial lobe indistinct, apv lobe reddish yellow, with rather large, rounded triangular apex, with one large bristle on shaft and two smaller bristle on apex; cercus moderate-sized, circular, white with broad black apical margin, with thin black outer and thin yellow inner curved bristles on margin. **Female.** Unknown.

**Type material.** **HOLOTYPE ♂,** **IRAN:** Mazandaran, Tangevaz, Sisangan National Forest (sampling site: Mazandaran_3), 36°21.917′N, 52°06.179′E, 692 m, 16.viii–5.ix.2011, MT, leg. Mohammad Khairandish & Ahmad Nadimi (TMUC).

**FIGURES 20–22.** Hercostomus albicoxa sp. nov., holotype. (20) habitus; (21) head; (22) hypopygium.
NEW IRANIAN DOLICHOPODINAE

Distribution and ecology. This species is only known from its holotype specimen collected in Mazandaran province (Iran). Its ecology remains unknown. Previously, this species has erroneously been recorded from Iran as *H. convergens* Loew, 1857 by Kazerani et al. (2014a).

Etymology. The name “*albicoxa*” refers to the whitish yellow colour of coxa I–III in this species.

Remarks. This species is very closely related to *Hercostomus convergens*. In fact, the key by Stackelberg (1933) directly leads to the couplet of *H. convergens* and *H. insularum*, but decisive differences were noticed between *H. convergens* and the new species. Moreover, the Iranian Malaise trap survey in Guilan (2010) yielded fresh specimens of *H. convergens* and also the holotype of this species (in ZMHB) was examined. Both species can be easily separated on the basis of the following features:

1. Coxa II with distinct brown spot on lateral surface. Postpedicel (Fig. 21) triangular, 1.2 x as long as deep, reddish yellow with apical ½ dark brown. Cercus (Fig. 22) circular with broad black margin, bearing stronger curved bristles.

*Hercostomus albicoxa* sp. nov. (Iran) (Fig. 20)
- All coxae entirely whitish yellow. Postpedicel (Fig. 24) elongate triangular, 1.5 x as long as deep, reddish yellow and only slightly infuscate on apical ½. Cercus (Fig. 25) circular with very narrow black margin, bearing short straight bristles . . . . .

Hercostomus setitibia Kazerani & Pollet sp. nov.
(Figs 26–29)

**Diagnosis.** Male. Rather large species, with dark metallic green body. Face silvery white, narrow. All postocular bristles black. Antenna entirely black, with postpedicel rounded subrectangular, about 1.3 x as long as deep. Legs nearly entirely black, with only coxa I–II, trochanters I–II, knees of femur I–III and tarsus I at least partly pale. Tibia II with conspicuous brush of inclined av and long erect vt bristles in basal ½ (MSSC). Tibia I with 4 very strong curved preapical bristles (MSSC). Tarsomeres tal, with rows of long rather erect ds setae (MSSC).

**Description.** Male. Body length: 5.3 mm; wing length: 5.2 (n=1). **Head.** Face silvery white, distinctly narrowing below antenna, then widening towards clypeus, at narrowest width about 0.3 x as wide as postpedicel (length), bare. Frons dark metallic green, entirely dusted silvery white. Occiput dark metallic green, slightly convex. Palpus rather small, about 1/6 of eye, ovoid, dark brown, with black pubescence and 1 strong black apical bristle. Proboscis dark brown. Eyes red with short white pubescence. All postocular bristles black. Two-three pairs of black postocellar bristles. Antenna entirely black, postpedicel rounded subrectangular, 1.3 x as long as deep, and about as long as scape and pedicel combined, with silverish pruinosity; stylus dorsal, inserted at apical 1/3, about 1.3 x as long as first three antennal segments combined, with short pubescence. **Thorax.** Entirely dark metallic green, brilliant; pleura and metapleura with distinct greyish pruinosity; scutellum bare on dorsum, with black pubescence and 1 strong black apical bristle. Thoracic bristles black. Six dc; 12 ac, biserial, reaching almost to level of 5th dc, 2 x as long as distance between rows; 1 large and 2 minute ant pprn, 1 internal and 1 external basal bristle. Eyes red with short white pubescence. All postocular bristles black. Two-three pairs of black postocellar bristles. Antenna entirely black, postpedicel rounded subrectangular, 1.3 x as long as deep, and about as long as scape and pedicel combined, with silverish pruinosity; stylus dorsal, inserted at apical 1/3, about 1.3 x as long as first three antennal segments combined, with short pubescence. **Wing.** Only very slightly infuscate. Veins R, gently curved, and M, with smooth bend in apical ¼ of wing, both converging towards wing apex, and parallel near apex. Proximal section of M, 0.9 x as long as apical section. Proximal section of CuA, 1.5 x as long as apical section. CuA, ratio: 2.6. Halter white, calypteral fringe with apical setae black and basal ones paler (brownish). **Legs.** Nearly entirely black, with only coxa I–II, trochanters I–II, knees of femur I–III and tarsus I at least partly pale. Bristles black. All coxa with greyish pruinosity. Coxa I with apical margin, coxa II with apical 1/5 (anterior and posterior face), and coxa III near apex (anterior face) reddish yellow; latter with external bristle inserted at middle. Trochanter I entirely reddish, trochanter II with basal ½ reddish yellow. All femora with narrow yellow knees; femur I with 1 small av and 1 larger pv preapical bristle; femur II with 1 strong ad, 1 smaller av and 1 pv preapical bristles; with 4 vt and 5 pv bristles on about basal ¼, about 0.8 x as long as femur is long; femur III with 1 strong ad preapical bristle, 1 small av and 1 larger pv preapical bristles; with multiple ad and vt rows of thin black strongly inclined setae on entire length, longest at middle and about as long as femur is deep (MSSC); with rather erect ds bristles on about basal 1/3, about 0.5 x as long as femur is deep. Tibia I slightly swollen towards apex with 4 ad (basalmost bristle smaller) and 4 pd bristles, longest 1.6 x as long as tibia is deep; with 2 pv bristles, about 2.2 x as long as tibia is deep; with 4 apv bristles, with two exceptionally long and distinctly curved ones, 4 x as long as tibia is deep (MSSC). Tibia II slightly swollen in basal ½, with 5 ad and 3 pd bristles, longest ones 2.7 x as long as tibia is deep; dense av pubescence of thin setae on basal 2/3, about as long as tibia is deep, and 2 av bristles, basalmost one 1.7 x as long as tibia is long (MSSC); with group of rather thin erect vt bristles on basal ½, 2.5 x as long as tibia is long (MSSC); and with 5 ap bristles. Tibia III with 7 ad, and 5 large and some smaller pd bristles, longest 3 x as long as tibia is deep, and with 2 ap bristles; with distinct pd row of bristles on about apical 3/4; with dense vt and av pubescence, including 4 distinct vt bristles, about as long as tibia is deep. Tarsus I with tal, black, becoming paler from tal, onwards, with tal, yellowish brown; with tal, slightly curved towards apex, with vt pubescence, as long as tal, is deep, and two longer erect vt bristles at basis.
FIGURES 26–28. Hercostomus setitibia sp. nov., male. (26) habitus; (27) antenna; (28) tibia II.
longest one 3 x as long as tal₁ is deep; tal₃₄ with rows of rather erect ds setae, about 2 x as long as tal₃₅ are deep (MSSC). Tarsus II with tall₁ with short vt bristle at basis, tall₄ with short pv pubescence along entire length, about as long as tarsomeres are deep, and each with 4–6 short robust apical bristles. Tarsus III with talIII₁,₃ with strong vt bristles among dense pubescence, about as long as talIII₁ is deep. Lengths ratio of femur/tibia/tarsomeres 1–5 in leg I: 5.1/5.2/2.6/1.4/1.2/1.2/1, in leg II: 8.2/9.2/4.3/2.2/1.8/1.5/1, and in leg III: 7.8/9.8/3.2/3.6/2.4/1.6/1.

Abdomen. With 5 pubescent segments, T₆ small but visible, about 0.6 x as long as T₅. Tergites entirely dark metallic green, brilliant, concolorous with mesonotum, with black bristles; T₁–₅ with strong bristles on posterior margin. Sternites dark metallic green, with short pale pubescence. Hypopygium (Fig. 29) distinctly pedunculate with epandrium mainly brownish black, with ventral half largely reddish yellow; hypondrium short, triangular; phallus dark brown with strong, hook-like subapical dorsal process; bv epandrial lobe small with long yellow seta, apv lobe well-developed with 3 yellow setae on caudal margin; surstylus yellow, with ventral surstylar lobe short, with distinctly enlarged triangular apex, and dorsal surstylar lobe larger, with ovoid apex, bearing one strong black ds bristle; postgonites slender with triangular apex; cerci large, black, crescent-shaped, about 2.3 x as long as wide, with multiple black setae, and slender apicodorsal process bearing 3 curved bristles. Female. Unknown.

Type material. HOLOTYPE ♂, IRAN: Guilan, Ghazichak (sampling site: Guilan_8), 36°45′57.54″N, 50°19′35.22″E, 1803 m, 27.vii–3.viii.2010, MT, leg. Mohammad Khairandish & Ahmad Nadimi (TMUC).
PARATYPES: IRAN: 1♂, same data as holotype (MAPC); 1♂, Guilan, Orkom (sampling site: Guilan_5), 36°45.739′N, 50°18.198′E, 1201 m, 22–29.vi.2010, MT, leg. M. Khairandish & A. Nadimi (ICHMM).

Distribution and ecology. The species has thus far only been collected in forest habitats in the northern Iranian province of Guilan.

Etymology. The species is named after its most conspicuous feature, namely the brush of black ventral setae on tibia II.

Remarks. Hercostomus setitibia sp. nov. clearly belongs to the Hercostomus nigrilamellatus species group sensu Pollet et al. (2010). This group contains large, dark-coloured species with a large hypopygium and a crescent-shaped cercus. MSSCs are found in the fore tibia (curved preapical bristle in H. nigriplantis (Stannius,
1831), *H. nigrilamellatus* (Macquart, 1827) and *H. setitibia* sp. nov.), the mid tarsus (strong vt bristles on tali, in *H. sahlbergi* (Zetterstedt, 1838) and *H. vockerothi* Assis Fonseca, 1976), and as observed for the first time, also in the mid tibia (brush of long av bristles in *H. setitibia* sp. nov.).

In the keys of Parent (1938) and Stackelberg (1933), *H. setitibia* sp. nov. might run to the couplet that leads to *H. nigrilamellatus*, if the presence of more than one curved preapical bristle on tibia I would be ignored. Both species differ quite substantially and the most useful diagnostic features are the following:

1  Tibia II with conspicuous brush of inclined long av erect black bristles in basal ½ (Fig. 28). Tibia I with 4 very strong curved preapical black bristles. Wing nearly hyaline. Epandrium (Fig. 29) with basodorsal part reddish yellow and relatively small apv epandrial lobe. Cercus (Fig. 29) rather narrow, with a slender apicodorsal process bearing three curved bristles .............. *Hercostomus setitibia* sp. nov. Kazerani & Pollet (Iran)

- Tibia II with normal vestiture, without av brush of bristles. Tibia I with 1 curved preapical black bristle. Wing slightly, evenly infuscate. Epandrium nearly entirely dark with massive apv epandrial lobe. Cercus broader, without apicodorsal process and regular arrangement of tubercles on apical margin, bearing curved bristles ........................................... *Hercostomus nigrilamellatus* (Europe, eastern and southern Russia)

*Poecilobothrus annulitarsis* Kazerani, Pollet & Khaghaninia sp. nov.  
(Figs 30–33, 36)


**Diagnosis.** Moderate-sized, rather robust species with brilliantly green body. Uppermost postoculars black, lower yellow. Antenna yellow with 1st antennomere dark brown on apicodorsal ½; postpedicel elongate triangular with rather acute apex. Legs mainly yellow, with coxa II–III and tarsus II–III entirely dark, femur III with apical 1/7 infuscate, and tibia III brownish black on apical 1/3 to 2/5. Male. Face golden yellow, narrow. Tarsus I annulated with tarsomeres 1-2 partly white, and tarsomeres 1,5 entirely black, latter not as long as deep (MSSC). Femur II and III with ventral row of thin erect white bristles on basal 1/3, at least 0.5 x as long as femur is deep (MSSC). Hypopygium with rather small quadratic apv epandrial lobe; cercus dark brown with yellow basis, rather elongated triangular, 2.5 x as long as wide at basis.

**Description. Male.** Body length: 4.2–4.5 mm (n=3); wing length: 4.3–4.5 mm (n=2). **Head.** Face golden yellow, slightly narrowing towards clypeus, at clypeus slightly widening again, at narrowest width about 0.4 x as wide as postpedicel (length), bare. Frons metallic green, dusted. Occiput metallic green, convex. Palpus very small, 1/10 of eye, roundish, yellow, with black pubescence and 1 strong black apical bristle. Proboscis brown. Eyes mainly green (in dry state), with strong reddish reflection in frontal view, with very short, yellow pubescence. Postocular bristles robust, with uppermost 1/3 black, and lower 2/3 yellow. Two pairs of black postocular bristles. Antenna with scape and pedicel entirely yellow; postpedicel elongate triangular with rather acute apex, yellow with about apicodorsal ½ dark brown, 1.6 x as long as deep, and 2.4 x as long as scape and pedicel combined; stylus dorsal, inserted at about middle, 1.5 x as long as first three antennal segments combined, with long pubescence. **Thorax.** Entirely brilliant metallic green, with large violet spot situated between sut iai, anterior sal and posterior npl bristles; pleura with silvery dusting; scutellum with 2 strong median and 2 minute lateral bristles, with sparse black pubescence on dorsum, posterior margin of scutellum with sparse black setae on upper border and with yellow setae on lower border. Thoracic bristles black, with dark insertion points. Six dc; 12 ac, biserial, reaching to level of 5th dc; 2 x as long as distance between rows; 1 strong and 3 minute ant pprn, 1 internal and 1 external bas pprn, 1 psut iai, 1 equal-sized sut iai, 2 npl, 2 spal, and 1 pal bristles. Upper proepisternum with rather long pale setae, lower proepisternum with 1 strong erect black bristle and a group of rather long mixed pale and dark setae at its basis. **Wing.** Distinctly and evenly infuscate, somewhat darker anteriad of vein R4+5. Vein R4+5 slightly curved, M4+5 with smooth bend, both converging towards wing apex. Proximal section of M1+2 nearly as long as apical section. Proximal section of CuA, 1.9 x as long as apical section. CuA ratio: 2.0. Halter white, calypter fragment black. **Legs.** Mainly yellow, with coxa II–III, femur III and tibia III and all tarsi at least in part infuscate. Bristles black. Coxa I yellow; coxa II and III brownish black, former with anterior face mainly and apical 1/4 of lateral face yellow; coxa III with 1 strong external bristle, inserted at about centre, with some minute black setae. Trochanters yellow. Femur I–III yellow, with femur III black on apical 1/7. Femur II–III with 1 strong ad preapical bristle.
femur I–III with 1 small pv preapical bristle, femur II with 2nd strong pv preapical bristle, nearly 0.5 x as long as ad preapical bristle; femur III with vt row of white erect thin bristles on less than basal 1/3, basal ones as long as femur is deep (MSSC); femur III with vt row of similar pale erect bristles at base, about 0.5 x as long as femur is deep (MSSC); basodorsal bristles on femur III indistinct. Tibia I–III yellow, with tibia III brownish black on apical 1/3 to 2/5. Tibia I with 2 ad and 2 pd bristles, with basalmost pair distinctly smaller and longest ones 3 x as long as tibia deep, and serration of short black ad bristles on apical 2/3; with 1 pv bristle at basal 2/5, 2 x as long as tibia is deep. Tibia II with 5 ad and 3 pd bristles, with basalmost pair distinctly smaller and longest bristles nearly 4 x as long as tibia is deep; with 2 equal-sized av bristles at basal 1/3 and 3/5, and 1 equal-sized pv bristle at apical 1/3. Tibia III with 5 strong ad and 5–6 strong pd (incl. 1 preapical ds) bristles, about 3.5 x as long as tibia is deep, with basalmost pair smaller, and with 3 strong ap bristles; with pd serration on apical 2/5 and dense black pubescence on posterior face on apical ½; with 3–5 vt (or av) bristles along entire length, 2 x as long as tibia is deep. Tarsus I distinctly annulated and shortened, tal1 yellow in basal ½, white and nearly bare in apical ¼ and black again in apical ¼; tal2 white and nearly bare with extreme basis and apex black; tal2–4 entirely black, flattened laterally with tal2–4, not as long as deep (MSSC). Tarsus II–III entirely black, taIII with dense vt pubescence with some stronger inclined bristles, nearly as long as tali, is deep. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 18.3/18.3/8.3/3.7/1.3/1/1.7, in leg II: 8.7/10.4/6.2/6.2/1.1/1.3/1, and in leg III: 7.6/10/2.9/3.3/2.3/1.5/1. Abdomen. With 5 pubescent segments, T5 short but visible. Tergites and sternites entirely metallic green, tergites with robust black bristles, and sternites with thin pale setae, rather erect on S1. Hypopygium with epandrium metallic green with brown ventral basis; hypandrium brown, short and triangular; bv epandrial lobe black, small, triangular and adjacent to hypandrium with 1 long pale seta, apv lobe yellowish brown, rather quadrate with apical margin straight (most distinct in left apv lobe), with one large seta on shaft and with 2 smaller setae on apical margin; cercus moderate-sized, dark brown, elongate triangular, 2.5 x as long as wide at base, with tubercles on ventral and apical margins, bearing curved black bristles. Female. Body length: 4.8–5 mm; wing length: 4.6–5.1 mm (n=3). As male, except for following features: face at narrowest width about 0.6 x as wide as postpedicel (length). Antenna: postpedicel bearing curved black bristles. Scape with pubescence shorter than in males. Abdomen with T5 entirely covered by T5, sternites with short dense black pubescence. Tarsus I, yellow, black at extreme apex, tal, entirely black. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 11.6/11/5.3/2.1/1.3/1/1.2, in leg II: 10.9/14.2/5.6/3.6/2.6/1.4/1, and in leg III: 9/11.6/3.1/3.2/2.3/2.1/1.4/1.

Type material. HOLOTYPE ♂, IRAN: East Azerbaijan, Arasbaran, Makidi Valley (Midiki Forest Park: forest), 38°50.693′N, 46°54.917′E, 1526 m, 8.vi.2012, SW, leg. Samad Khaghaninia (ICHMM). PARATYPES: IRAN: 1♂, 1♀, East Azerbaijan, Arasbaran, Aynali (forest), 38°53.756′ N, 46°46.765′E, 1221 m, 20.vi.2014, SW, leg. S. Khaghaninia (ICHMM); 1♀, same data (MAPC); 2♂, East Azerbaijan, Arasbaran, Keleybar (forest), 38°50.903′ N, 47°00.367′E, 1524 m, 12.vii.2013, SW, leg. S. Khaghaninia (ICHMM); 3♂, East Azerbaijan, Arasbaran, Keleybar (forest), 38°51.548′N, 46°59.007′E, 1783 m, 1.vii.2013, SW, leg. S. Khaghaninia (ICHMM); 3♂, East Azerbaijan, Arasbaran, Makidi Valley (Midiki Forest Park: forest), 38°51.051′N, 46°54.892′E, 1406 m, 8.vi.2013, SW, leg. S. Khaghaninia (ICHMM); 1♀, same data as holotype; 7♂, 3♀, Mazandaran, Gaznasara, Nur forests Park (sampling site: Mazandaran 8), 36°34.883′N, 52°02.763′E, -14 m, 9–28.vi.2012, MT, leg. M. Khairandish & A. Nadimi (TMUC); 2♂, 2♀, Mazandaran, Gaznasara, Nur Forest Park (sampling site: Mazandaran 8), 36°34.883′N, 52°02.763′E, -14 m, 9–28.vi.2012, MT, leg. M. Khairandish & A. Nadimi (TMUC); 2♂, same data as TMUC; 1♂, Mazandaran, Gaznasara, Nur Forest Park (sampling site: Mazandaran 8), 36°34.883′N, 52°02.763′E, -14 m, 9–28.vi.2012, MT, leg. M. Khairandish & A. Nadimi (TMUC); 2♂, same data as TMUC; 1♂, Mazandaran, Gaznasara, Nur Forest Park (sampling site: Mazandaran 8), 36°34.883′N, 52°02.763′E, -14 m, 9–28.vi.2012, MT, leg. M. Khairandish & A. Nadimi (TMUC); 2♂, Mazandaran, Tangevaz, Sisangan National Forest (sampling site: Mazandaran 3), 36°21.917′N, 52°06.179′E, 692 m, 28.vi–13.vii.2011, MT, leg. M. Khairandish & A. Nadimi (TMUC); 2♂, West Azerbaijan, Urmia (grassland), 37°20.768′N, 45°09.455′E, 1343 m, 16.v.2014, SW, leg. S. Khaghaninia (ICHMM).

Distribution and ecology. The species has been encountered in three provinces (East Azerbaijan, West Azerbaijan, and Mazandaran) in Iran. It seems to be rather widespread and has nearly exclusively been found in forest habitats at altitudes between -14 m and 1800 m between the first half of May until mid-August. It thus seems to avoid upper montane habitats. Previously, P. annulitarsis has erroneously been reported from Iran as P. chrysoszygos (Wiedemann, 1817) by Khaghaninia et al. (2013a) and Kazerani et al. (2014a, 2015).

Etmology. The name “annulitarsis” refers to the annulated nature of tarsus I, which features two basalmost tarsomeres with alternative white and black bands.
FIGURES 30–35. Poecilobothrus annulitarsis sp. nov., male: (30) habitus; (31) fore tarsus; (32) antenna; (33) cercus. Poecilobothrus chrysozygos, male: (34) fore tarsus; (35) cercus.

Remarks. Poecilobothrus annulitarsis is very closely related to P. chrysozygos which is expressed by a shared MSSC, the annulated fore tarsus (Figs 31, 34). This MSSC separates these species from all other congeners in the Palaearctic. However, there are also sufficient differences between both species to assign P. annulitarsis species status. The two species can be differentiated as follows:

1 Fore tarsus (Fig. 31) with tarsomeres I$_{3-5}$ laterally flattened, tarsomeres I$_{3-4}$ wider than long. Femur II with vt row of white erect thin bristles on less than basal 1/3, basal ones as long as femur is deep. Femur III with vt row of similar pale erect bristles at basis, about 0.5x as long as femur is deep. Apicoventral epandrial lobe (Fig. 36) relatively large, quadrate with straight apical border. Cercus (Fig. 33) dark brown with yellow basis, rather elongated triangular, 2.5x as long as wide at base ........ Poecilobothrus annulitarsis sp. nov. (Iran) (Fig. 30)

- Fore tarsus (Fig. 34) with tarsomeres I$_{3-5}$ cylindrical, tarsomeres I$_{3-4}$ at most as long as wide. Femur II with irregular rows of white erect thin setae on about basal ¼, basalmost about 0.4x as long as femur is deep. Femur III with irregular rows of very short white slightly inclined setae on basal ¼. Apicoventral epandrial lobe relatively small, with rounded apex. Cercus (Fig. 35) entirely dark brown, triangular, 2x as long as wide at base ........ Poecilobothrus chrysozygos (Palaearctic, incl. southern and eastern Russia, Armenia, Kazakhstan)

Poecilobothrus innotabilis Kazerani, Pollet & Khaghaninia sp. nov. (Figs 37–39)

Poecilobothrus bigoti Kazerani et al. 2015: 25, not Mik, 1883: 88.

Diagnosis. Moderate-sized, rather robust species with brilliantly bronze body. Uppermost postoculairs black, lower yellow. Antenna black, only scape with brownish yellow apicoventral corner. Legs mainly yellow with coxa I brownish on lateral face, femur III slightly and tibia III distinctly infuscate at apex; tarsi I–II black with metatarsus partly yellow, and tarsus III entirely dark. Male. Face silvery white. Wing slightly infuscate with apical ½ of wing strongly infuscate anteriorly. Femur III with a irregular vt row of peculiar short erect bristles between basal 2/5 and apical 1/6 (MSSC). Hypopygium: apv epandrial lobe pale reddish yellow, rather quadrate; cercus moderate-sized, elongate triangular, 1.3x as long as wide at basis, blackish brown, with basal 1/3 reddish yellow; with tubercles along all margins bearing strongly curved black bristles.
Description. Male. Body length: 4.7–5.1 mm; wing length: 4.4–4.5 mm (n=2). Head. Face silvery white with small central bronze spot below antennae, narrowing until middle, then slightly widening towards clypeus, at narrowest width 0.8 x as wide as postpedicel (length), bare. Frons bronze, dusted silvery white laterally. Occiput greenish bronze, convex. Palpus very small, less than 1/10 of eye, yellow, with black pubescence and 1 strong black apical bristle. Proboscis brown. Eyes red, with short dense white pubescence. Postocular bristles with about uppermost 1/4 black, and lower ¾ yellow. Two-three pairs of black postocellar bristles. Antenna nearly entirely black, with only scape blackish brown with apex brownish yellow ventrally; postpedicel subcircular with blunt apex, 1.1 x as as long as deep, and 0.9 x as long as scape and pedicel combined; stylus dorsal, inserted at middle, about 2.1 x as long as first three antennal segments combined, with 1st aristal segment nearly bare, and 2nd aristal segment distinctly pubescent. Thorax. Entirely bronze, brilliant, with distinct violet spot between sut ial, anterior spal and posterior npl bristles; pleura and metapleura with slight greyish dusting; scutellum with 2 strong median and 2 minute lateral bristles, a few black setae on disk and fringe of short white setae on lower posterior margin. Thoracic bristles black. Six dc; 12 ac, biserial, reaching between 5th dc, 2 x as long as distance between rows; 1 large and 2 minute ant pprn, 1 internal and 1 external bas pprn, 1 psut ial, 1 sut ial, 2 npl, 2 spal, and 1 pal bristles; with additional short pubescence on anterior part of thorax. Upper proepisternum with rather long white setae, lower proepisternum with 1 strong black bristle and similar setae. Wing. Strongly infuscate in apical ½ between anterior wing margin and vein R₄₊₅, along apical section of M₁,₂ and along dm-cu, wing otherwise slightly infuscate. Veins R₄₊₅ very slightly curved, and M₁,₂ slightly sinuous, slightly converging towards wing apex.
Proximal section of M₁₂: 0.9 x as long as apical section. Proximal section of CuA₁: 1.8x as long as apical section. CuA₁ ratio: 1.8. Halter white, calypteral fringe black. **Legs.** Mainly yellow, with coxae I–III, tarsus I–II and leg III at least partly infuscate. Bristles black. Coxa I mainly yellow on anterior face and brownish on lateral face, with short yellow pubescence on about basal ½, and stronger black pubescence and black bristles on apical ½. Coxa II mainly dark, with anterior face partly yellowish in basal 2/3, and entirely yellow on apical 1/3. Coxa III entirely dark, with external bristle inserted at about middle. Trochanter I yellow, trochanters II–III brownish yellow. Femur I–II entirely yellow, femur III yellow with about apical 1/5 slightly infuscate; femur I with 1 small pv preapical bristle; femur II with 1 strong ad, 1 strong and 1 small pv preapical bristles and one vt row of short inclined black bristles on basal ½, decreasing in length towards apex; femur III with 1 strong ad and 1 small pv preapical bristles, with vt row of 4–5 inclined black bristles on about basal 1/5, about 0.3 x as long as femur is deep (MSSC); with an irregular vt row of peculiar short erect black bristles between basal 2/5 and apical 1/6 (MSSC); basodorsal bristles indistinct. Tibia I and II entirely yellow, tibia III yellow with apical 1/4 black. Tibia I with 2 ad and 2 pd bristles, nearly 4 x as long as tibia is deep, basalmost pair clearly smaller, and with ad serration of short bristles on apical 2/3; with 3 pv bristles, about 1.7 x as long as tibia is deep. Tibia II with 4 ad and 2 pd, about 3.5 x as long as tibia is deep, basalmost ad bristle shorter; with 3 av and 1 pv bristles, about 3 x as long as tibia is deep; with 5 strong ap bristles, about 3.5 x as long as tibia is deep. Tibia III with 4 ad and 5 pd bristles (incl. preapical ds bristle), about 2.5–4 x as long as tibia is deep; with 5 vt bristles and 2 strong ap bristles, 2.5 x as long as tibia is deep; pd pubescence indistinct. Tarsus I black with tal, yellow on basal ¼; tarsus II black with at most basal ½ of tal, yellowish; tarsus III entirely black; tali–III_s with short vt bristles. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 10.8/11/4.8/2/1.6/1/1.3, in leg II: 9.5/10.9/4.2/2.3/1.6/1/1.1, and in leg III: 8/10.2/8.2/2.1/2.1/2.1. **Abdomen.** With 5 pubescent segments, T₁ small but visible. Tergites entirely metallic green, with black short pubescence, and with strong bristles on posterior margins. Sternites metallic bluish green, S₁ and anterior ½ of S₃, with pale pubescence, longest and erect on S₄, and posterior ½ of ST₁ and ST₂ with black pubescence, longest and erect on S₅. Hypopygium with epandrium metallic green with basoventral part yellowish brown; hypandrium short, straight, dark brown; bv epandrial lobe very small, black, with 1 black apical bristle, apv epandrial lobe pale reddish yellow, rather quadrate, with 1 large pale bristle at basis and 2 pale bristles on apical margin; surstylar lobes dark brown; bv epandrial lobe very small, black, with 1 black apical bristle, apv epandrial lobe pale reddish yellow, with tubercles along all margins bearing strongly curved black bristles. **Female.** Body length: 4.8–5.0 mm; wing length: 4.5–4.7 mm (n=2). As male, except for the following features: face at narrowest width about 2 x as wide as postpedicel (length). Abdomen with T₁ entirely covered by T₂, S₁ with short white pubescence, and S₂₅ with short black pubescence. Wings slightly and evenly infuscate, with darker zone between veins C and R₁₂₃. Femur II and III with regular short inclined black vt bristles. Length ratios of femur/tibia/tarsomeres 1–5 in leg I: 12.3/10.5/4.3/9.1/5.1/2/1, in leg II: 8/9.10/4.5/2.3/1.7/1/2/1, and in leg III: 8.7/11/3.4/3.1/2.3/1.3/1.

**Type material.** **HOLOTYPE sp. nova.** IRAN: Ardabil, Meshginshahr, Geyneje (nr Sabalan Mountain: montane grassland), 38°20.370′N, 47°48.667′E, 2991 m, 25.vi.2014, SW, leg. Samad Khaghaninia (ICHMM). **PARATYPES: IRAN:** 4♂, same data as holotype; 1♂, 1♀, same data (MAPC); 3♂, East Azerbaijan, Arasbaran, Aynali (forest), 38°53.887′N, 46°46.955′E, 1271 m, 25.v.2013, SW, leg. S. Khaghaninia (ICHMM); 1♂, Mazandaran, Gaznasara (sampling site: Mazandaran 6: beside a hill), 36°16.968′N, 52°10.927′E, 2013 m, 3–16.vii.2011, MT, leg. M. Khairandish & A. Nadimi (TMUC); 3♂, 1♀, Mazandaran, Gaznasara (sampling site: Mazandaran 7), 36°16.947′N, 52°10.975′E, 2032 m, 3–16.viii.2011, MT, leg. M. Khairandish & A. Nadimi (TMUC).

**Distribution and ecology.** *Poecilobothrus innotabilis* has thus far been collected in three provinces (Ardabil, East Azerbaijan, Mazandaran) in Iran. Although it seems to occur in different habitat types, the largest sample of this species was taken in an Ardabil montane grassland. Previously, *P. innotabilis* has erroneously been reported from Iran as *P. bigoti* Mik, 1883 by Kazerni et al. (2015).

**Etymology.** In contrast to e.g. *Poecilobothrus nobilitatus* (Linnaeus, 1767), *P. regalis* (Meigen, 1824) and *P. chrysozogos*, which show a conspicuous coloration of the wing or the legs, *P. innotabilis* sp. nov. lacks these features, hence its name (= not noticeable).

**Remarks.** In the key by Parent (1938), the new species runs to *P. basilicus* (Loew, 1869), but clearly differs from this species by not having the scape broadly yellowish brown nor the pedicel with a brown spot. *Poecilobothrus basilicus* is also considerably larger (holotype in ZMHB, examined). Neither the key by Stackelberg (1941) nor that by Khaghaninia et al. (2013a) provides a couplet for species with a silvery white face.
and a black antennae with the scape only brown at its apicoventral corner. In both keys, the character “antenna entirely black” leads to *P. bigoti* Mik, 1883 which is a totally different species featuring a cercus without a jagged margin (see Parent, 1938, fig. 184, p. 151; species also present in the reference collection of the last author). The species is neither conspecific with *P. armeniorum* (Stackelberg, 1934) for the following reasons:

1   Scape with brown apicoventral corner, antenna otherwise black. Coxa I mainly yellow on anterior face and brownish on lateral face. Cercus blackish brown, with basal 1/3 reddish yellow. Body length about 5 mm.  

*Poecilobothrus innotabilis* sp. nov. (Iran)  


*Poecilobothrus armeniorum* (Stackelberg, 1941) (Armenia, southern Russia)

**Discussion**

The combined surveys yielded 110 different species, including nearly 30 species new to science. Dolichopodinae accounted for 38% (*n=42*) of the species, and only 20% (*n=697*) of the specimens. This discrepancy was mainly due to the high abundances of some non-dolichopodine species. In fact, the 10 most abundant species represent 64% of the total yields, and did not include a single dolichopodine species. The most abundant dolichopodine species was identified as *Gymnopternus blankaartensis* (Pollet) with 60 specimens.

The dolichopodine fauna of the investigated sites in the western and central parts of northern Iran has a typical western Palaearctic (European) composition as all main European dolichopodine genera were represented in the samples: *Dolichopus* (18 species), *Hercostomus* (10 spp.), *Gymnopternus* (5 spp.), *Poecilobothrus* (4 spp.), *Sybistroma* (3 spp.) and *Tachytrechus* (1 spp.). The four remaining European dolichopodine genera have not been collected in Iran thus far. *Ortochile* Latreille with three species in western Europe is a southern genus that has been recorded as far east as Israel and Turkey (Negrobov 1991; Yang et al. 2006) and it is not unlikely that this genus is present in Iran. *Ortochile* species are visitors of flowers in dry habitats. *Muscidideicus praetextatus* (Haliday, 1855) is a strictly halobiont species of western European salt marshes, thus far recorded as far south as Portugal and Spain. *Ethiromyia chalybea* (Wiedemann, 1817) is the only representative of a genus erected recently by Brooks & Wheeler (2005) and occurs in both reed marshes and wooded forests on loamy soils (Pollet 1992; Pollet et al. 1992). Finally, *Setihercostomus* Zhang & Yang, 2005 has only recently been discovered in central Europe (Pollet 2009b) and its ecology is entirely unknown.

It is no surprise that six of the eight species described here were initially identified as known species (for references, see respective species descriptions). One of the explanations for this is most certainly the presence of surprisingly similar (e.g., *P. annulitarsis* sp. nov.) or even nearly identical MSSCs (e.g., *P. fuscicercus* sp. nov.) in the Iranian species as compared to their sibling species in Europe. Focusing mainly on these MSSCs with less attention to the other features of the species in detail must ultimately and inevitably lead to incorrect identifications. The situation is even more precarious in species lacking conspicuous MSSCs (e.g. *D. subimmaculatus* sp. nov. and *G. flavitibia* sp. nov.). Every current identification key will produce the name of a described species, unless the researcher has a reference collection or access to type material to compare specimens. Having this comparative European material has proved essential for the study of Iranian Dolichopodidae (and possibly also other invertebrates) recently. Moreover, it cannot be excluded that Middle Eastern, Central Asian or even Southern Russian records of the sibling European species might in reality refer to the species newly described here.

One hypothesis for these subtle morphological differences is that the Caspian Hyrcanian Mixed Forests in northern Iran have served as a refugium for flora and fauna during the Last Glacial Maximum (LGM), where species that were shared with pre-ice age Palaearctic faunas developed separately which ultimately led to speciation. In *Aeschna* Fabricius (Odonata), similar patterns have recently been discovered (Schneider et al. 2015). The validity of this hypothesis will be tested further during the examination of the other new Iranian dolichopodid species that were discovered during the ongoing and future studies.

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**References**


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