



## New species and new records of hybotid dance flies (Diptera: Hybotidae: Tachydromiinae) from Iranian mangrove habitats

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**ABSTRACT.** The family Hybotidae (Insecta: Diptera, Empidoidea) is recorded for the first time from mangrove habitats in Iran (Hormozgan Province). Four species belonging to the subfamily Tachydromiinae have been found of which two species are recorded for the first time from the territory of Iran: *Crossopalpus subaenescens* Collin, 1960 (broadly distributed over the Middle East) and *Elaphropeza feminata* Shamshev & Grootaert 2007 (known only from mangroves of Singapore). In addition, *E. feminata* is newly recorded species for the Palaearctic Realm. Two species are described and illustrated as new to science: *Drapetis hormozganiensis* **sp. nov.** and *Elaphropeza marduensis* **sp. nov.** The mangrove habitats in Iran do not consist of high hybotid species richness comparing with the high diversity of this family in mangroves of tropical areas. Morphologically, recorded species of *Crossopalpus* and *Drapetis* have the closest allies amongst the Palaearctic species. However, the species of *Elaphropeza* is closely related to the known Oriental species (primarily from Singapore).

**Keywords:** Empidoidea, *Crossopalpus*, *Drapetis*, *Elaphropeza*, distribution, Hormozgan, Palaearctic

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### INTRODUCTION

The family Hybotidae (or hybotid dance flies) is one of the largest groups of empidoid flies comprising about 2300 described species (Shamshev, 2016; Sinclair & Cumming, 2017). The hybotids have worldwide distribution but they are especially diverse in tropical regions. Some broadly distributed genera of this family exhibit high levels of species diversity in temperate regions as well (e.g., *Platypalpus* Macquart). About 700 species of Hybotidae are currently known from the Palaearctic Realm (Shamshev, 2016). However, only seven species have been recorded from the territory of Iran (Raffone, 2007; Kazerani et al., 2022). The hybotids have been shown to include many species that adapted to specific mangrove conditions. Their fauna in mangrove habitats was intensively investigated in Singapore and Hong Kong (Grootaert, 2019; Grootaert & Shamshev, 2012). Our paper is the first report of Hybotidae occurring in mangroves of South Iran. All species collected during this survey belong to the subfamily Tachydromiinae.

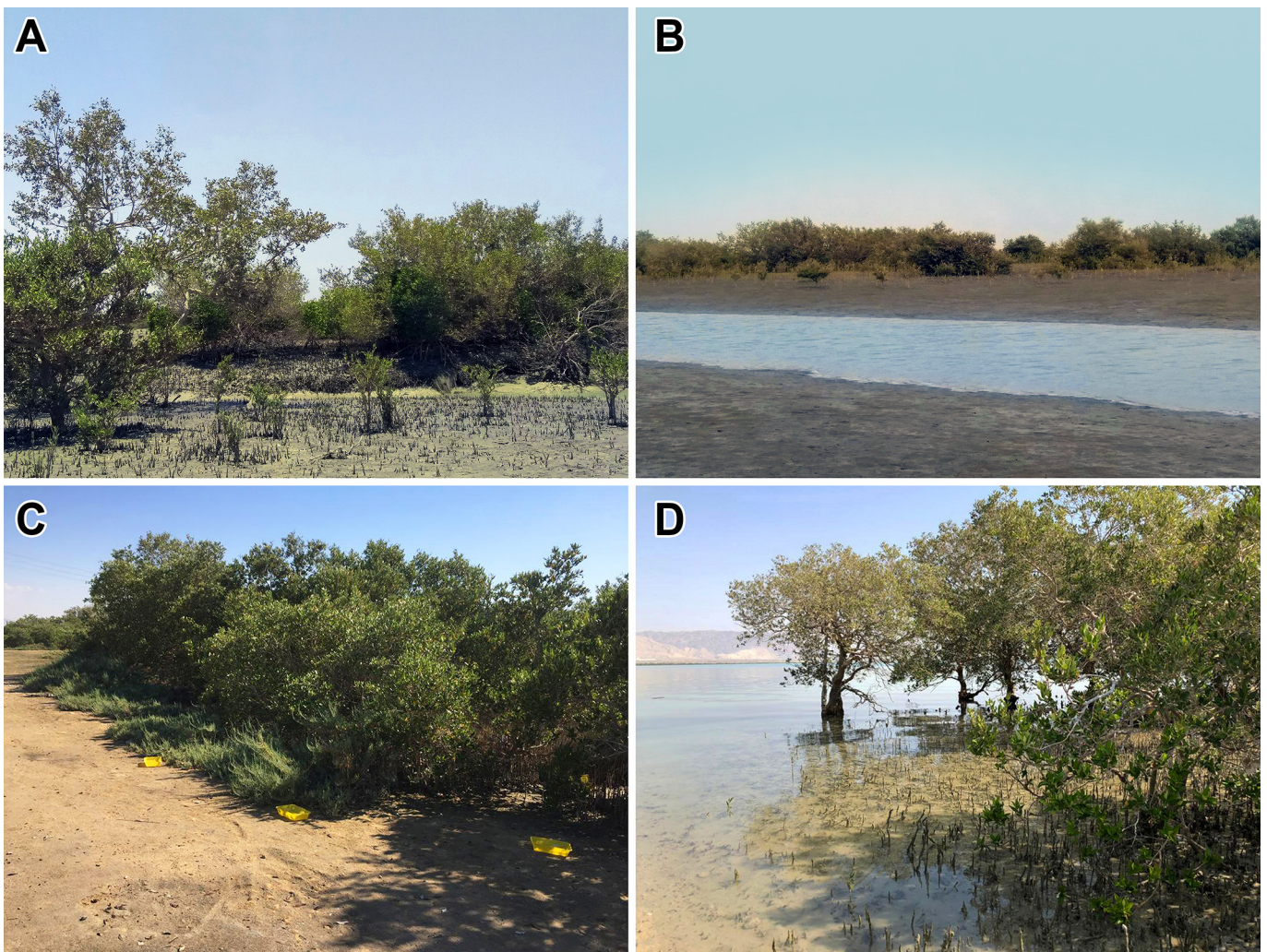
The Iranian mangrove forests with about 93.37 km<sup>2</sup> are located in the south and southeastern coastlines, close to the Persian Gulf and Oman Sea. The largest mangrove area in Iran (67.5 km<sup>2</sup>) is a region between Khamir port and northwest of Qeshm Island (Hormozgan province) (Zahed et al., 2010). The purpose of this study is to clarify the fauna of flies of the family Hybotidae in Iranian mangrove habitats based on the examination of available material collected from the region.

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## MATERIAL AND METHODS

This study is based on material deposited in the Hayk Mirzayans Insect Museum, Iranian Research Institute of Plant Protection (HMIM) and the Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (ZISP). The specimens were collected from the mangrove habitats located in southern Iran, Hormozgan province (Fig. 1) by yellow pan traps and light traps. In order to properly recover the material from ethanol, we followed the AXA method proposed by van Achterberg (2009). To facilitate observations, the terminalia were macerated in cold 10% KOH and immersed in glycerine. The photographs were taken using a Canon® EOS 11 40D camera using a Canon MP-E 65 mm objective, with multiple layers combined using the Helicon Focus® 7.6 software. The photographs of male terminalia served as models for the outline of hand-drawn illustrations. Terms used for adult structures follow those of Cumming & Wood (2017). In descriptions, the right and left side of the male terminalia are based on the unrotated position viewed posteriorly, such that in the illustrations the right surstylus appears on the reader's left side and vice versa. Male terminalia are figured in their unrotated position. Male body length was measured from the antennal base to the tip of genitalia and female body length from the base of the antennae to the tip of cerci. Thoracic setae are counted on one side of the body (except scutellars). The species are arranged alphabetically. We refer to Grootaert & Shamshev (2012) for a full list of synonyms.



**Figure 1.** Mangrove habitats in Iran. **A.** Hormozgan Province, Sirik, Azini wharf; **B.** Hormozgan Province, Gabrik protected area, Keyki; **C-D.** Hormozgan Province, Bandar-e Khamir, Marduo Island.

## RESULTS

### *Taxonomic hierarchy*

**Class Insecta Linnaeus, 1785**

**Order Diptera Linnaeus, 1758**

**Suborder Brachycera Macquart, 1834**

**Superfamily Empidoidea Latreille, 1804**

**Family Hybotidae Meigen, 1830**

**Subfamily Tachydromiinae Meigen, 1822**

**Genus *Crossopalpus* Bigot, 1857**

*Crossopalpus* Bigot, 1857:557, 563. Type-species: *Platypalpus ambiguus* Macquart, 1827, by monotypy.

**Remarks.** The genus *Crossopalpus* comprises about 90 species worldwide (Grootaert & Shamshev, 2012; Freitas-Silva & Ale-Rocha, 2019; Grootaert & Beuk, 2024). Species of *Crossopalpus* inhabit different biotopes including the sandy or swampy banks of lakes and rivers as well as seashore areas (Chvála, 1975). Grootaert & Shamshev (2012) reported one species of *Crossopalpus* inhabiting the mangroves of Singapore. One species of this genus was found here in the Gabrik protected area. This is the second species of *Crossopalpus* known from the territory of Iran. Earlier, Raffone (2007) recorded *C. humilis* (Frey, 1913) from Central Iran (Isfahan Province).

***Crossopalpus subaenescens* Collin, 1960**

*Crossopalpus subaenescens* Collin, 1960:386. Type-localities: "in Egypt at Kerdace, Ezbet Naghl and Siva; in Palestine at the Dead Sea, Mount Scopus, Jerusalem and from Carmel, Haifa; S. Arabia, Yemen Prov."

**Material examined.** 7 ♂♂, 4 ♀♀, Iran: Hormozgan Prov., Gabrik protected area, Keyki, 25°41'49.7"N, 058°30'32.9"E, 0 m a.s.l., light trap, 15.v.2022, M. Mofidi & A. Hajiesmaeilian.

**Distribution.** Palaearctic: Asia: Jordan, Iran, Israel, Yemen; North Africa: Egypt. Afrotropics: Sudan.

**Remarks.** *Crossopalpus subaenescens* is broadly distributed over the Middle East but it is recorded for the first time from Iran. The specimens that we examined were collected by a light trap.

**Genus *Drapetis* Meigen, 1822**

*Drapetis* Meigen, 1822:91. Type species: *D. exilis* Meigen, 1822, by monotypy.

**Remarks.** Currently, *Drapetis* includes about 85 species worldwide, of which 31 are known from the Palaearctic Realm (Grootaert, 2016; Grootaert & Shamshev, 2012; Grootaert & Hellqvist, 2020; Grootaert et al., 2020; Michelsen & Grootaert, 2019; Raffone, 2011, 2013). In temperate regions, species of *Drapetis* are found on the bark of tree-trunks, on ground-vegetation, etc. (Chvála, 1975). Grootaert & Shamshev (2012) described a complex of four species of *Drapetis* inhabiting the mangroves of Singapore. The new species described herein is the second species of *Drapetis* known from the territory of Iran. Earlier, Raffone (2007) recorded *D. pictitarsis* Engel from South-West Iran (Khorramshahr, Khuzestan Province).

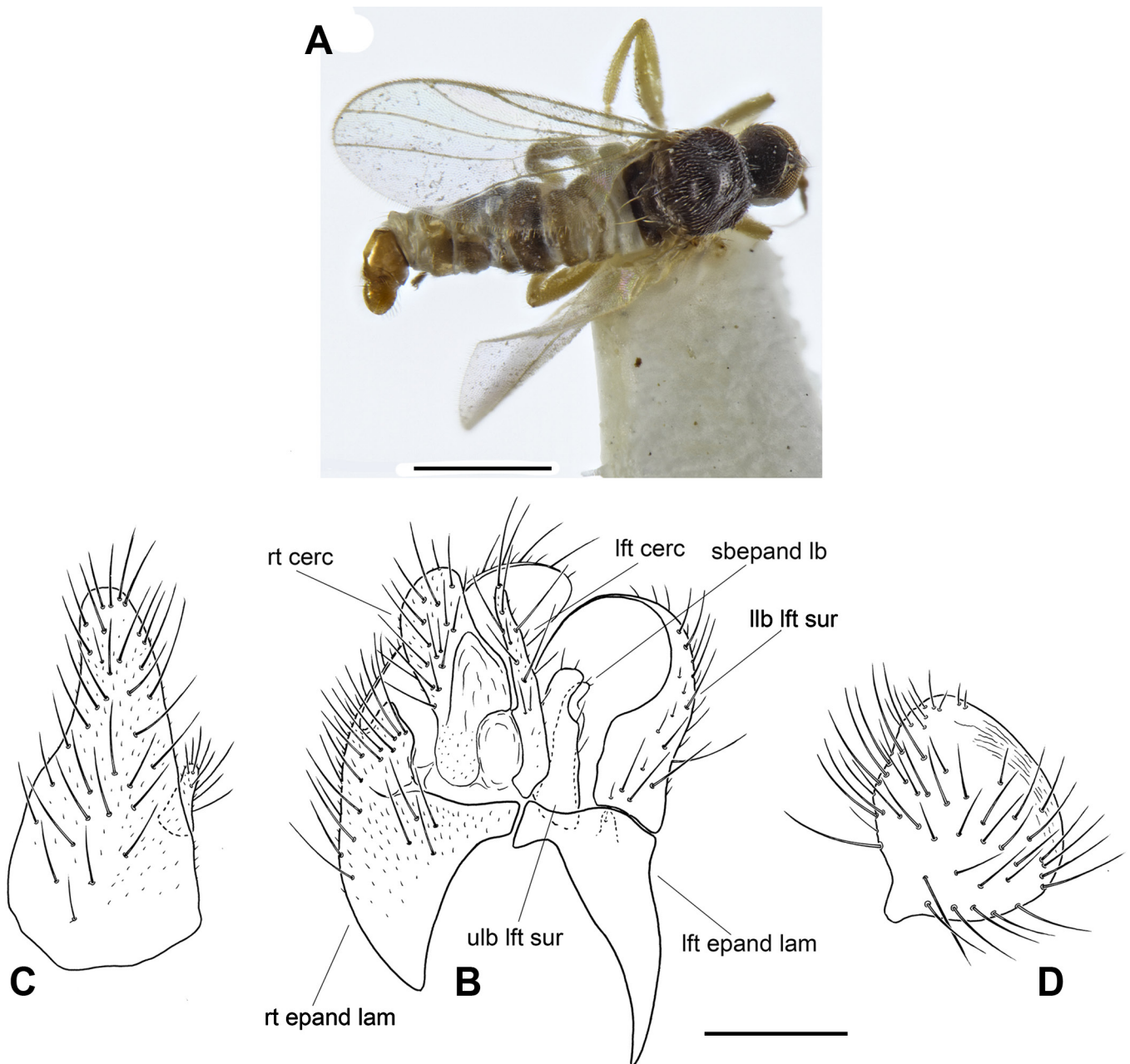
***Drapetis hormozganiensis* sp. nov. (Fig. 2)**

<https://zoobank.org/urn:lsid:zoobank.org:act:500A15EB-F978-421D-9ADA-7026395E542A>

**Type material.** **Holotype** ♂, IRAN: Hormozgan Prov., Sirik, Azini wharf, 26°19'39.9"N, 057°06'15.7"E, 0 m a.s.l., pan trap, 13.v.2022, M. Mofidi & A. Hajiesmaeilian (ZISP); **Paratypes:** 5 ♂♂, 3 ♀♀, same data as holotype (HMIM, ZISP).

**Etymology.** The epithet refers to the type locality of the new species, Hormozgan Province (Iran).

**Diagnosis.** Small species (wing 1.3 mm) with crossveins r-m and bm-m close together; antennal scape and pedicel brownish yellow to yellow, postpedicel brown; head and thorax with yellow to pale setae; legs robust, almost entirely yellow, only tarsomere 5 brown; male mid femur with short, strong dark setae ventrally and mid tibia with black spinules ventrally.



**Figure 2.** *Drapetis hormozganiensis* sp. nov., male. **A.** Habitus, holotype, dorsal view; **B–D.** Hypopygium; **B.** Epandrium and cerci; **C.** Right epandrial lamella, lateral view; **D.** Lower lobe of left surstylus, lateral view. **Abbreviations.** lft cerc: left cercus; lft epand lam: left epandrial lamella; llb lft sur: lower lobe of left surstylus; rt cerc: right cercus; rt epand lam: right epandrial lamella; sbepand lb: subepandrial lobe; ulb lft sur: upper lobe of left surstylus. Scale bars: A. 0.5 mm, B–D. 0.1 mm.

**Description.** — **Male** (Fig. 2A). Body length 1.5–1.7 mm, wing length 1.3 mm. Head brown, pale setose. Frons V-shaped, narrow above antennae, widened towards ocellar tubercle, faintly greyish pruinose. Face and clypeus densely greyish pruinose. Occiput greyish pruinose; vertical setae long, inclinate. Ocellar setae of subequal lengths, anterior pair inclinate, posterior pair latero-clinate. Antenna with scape and pedicel brownish yellow to yellow, postpedicel and stylus brown; pedicel mostly with subequally short setulae, 1 seta beneath longer (nearly as long as length of pedicel); postpedicel conical, nearly 2× as long as basal width; stylus apical, moderately long, nearly 2.5× as long as postpedicel. Proboscis yellowish brown. Palpus dirty yellow, small, rounded, bearing scattered setulae, subapical seta short, thin.

*Thorax.* Mostly brownish, mesopleuron rather yellowish brown, extensively shiny; prothoracic sclerites, mesoscutum in front of scutellum, scutellum, postnotum faintly pruinose; strong setae yellow to pale. Prothoracic episterna with 1 setula just above fore coxa and 1 short upturned seta on upper part. Postpronotal seta not prominent. Anepisternum (= mesopleuron) with numerous setulae on upper part. Mesonotal setae: rows of acrostichals and dorsocentrals undifferentiated, scutum evenly covered with numerous pale setulae, 1 pair of long prescutellar setae; 2 notopleurals, 1 postsutural supra-alar, 1 postalar and 4 scutellars (apical pair very long, cruciate; lateral pair very short). Legs robust, almost entirely yellow, only tarsomere 5 brown, mostly pale setose. Coxae and trochanters with unmodified setation. Fore femur with rows of anteroventral and posteroventral setulae, 1 long fine seta near base. Fore tibia lacking prominent setae. Mid femur simple, smooth and covered with uniform setulae anteriorly, bearing short, strong dark setae ventrally (less distinct close to apex), 1 moderately long subapical seta anteriorly. Mid tibia simple, with black ventral spinules. Hind femur with somewhat longer anteroventral setae subapically and 4 short, erect dorsal setae near base. Hind tibia lacking prominent setae; apical projection small, rounded. Tarsi of all legs unmodified, with unmodified setation. Wing normally developed, hyaline, veins brownish yellow to yellow. Basal costal seta present, moderately long, brownish yellow. Costal index (proportions of distances between humeral crossvein and  $R_1$  /  $R_1$  and  $R_{2+3}$  /  $R_{2+3}$  and  $R_{4+5}$ , respectively): 2.7/1/1.6. Vein  $R_{2+3}$  gently curved. Veins  $R_{4+5}$  and  $M_{1+2}$  mostly slightly divergent, parallel nearly at apical 1/4 of wing;  $R_{4+5}$  slightly sinuate;  $M_1$  nearly straight. Crossvein bm-m perpendicular, crossvein r-m slightly beyond middle of cell bm; distance between bm-m and r-m nearly 2× shorter than apical portion of M4 and 2.5–2.6× longer than bm-m. Halter pale yellow.

*Abdomen.* Tergite 1 pale, remaining tergites brownish; tergites 2–3 of subequal width (viewed laterally), with ordinary setae; tergite 4 broadest, pruinose, with squamiform setae laterally; tergite 5 very narrow dorsally, with squamiform setae laterally; tergites 6–7 of subequal width, nearly as broad as tergites 2–3; with ordinary setae, tergite 7 with short, brownish yellow posteromarginal setae. Sternites weakly sclerotised, bearing scattered setulae. Hypopygium (Figs 2B–D) moderately large, brownish. Epandrium completely divided (Fig. 2B). Right epandrial lamella subtriangular (Fig. 2C), with small, subtriangular dorsal projection; covered with numerous, long simple setae; right surstylus undifferentiated from apex of epandrial lamella. Left epandrial lamella fused to hypandrium, lacking setation apically; left surstylus represented by two separated sclerites (lobes); upper lobe (close to cerci) rather subrectangular, narrow, with scattered setae; lower lobe large, subglobular in lateral view (Fig. 2D), covered with numerous long setae; subepandrial lobe slender. Cerci separated (Fig. 2B); right cercus rather subrectangular, moderately broad, rounded at apex, with ordinary setae of different lengths; left cercus much narrower and slightly shorter than right cercus, digitiform, very slender, with ordinary setae of different lengths. Phallus short. Two rod-shaped apodemes.

**Female.** Similar to male except as follows. Mid femur with finer, yellowish setae ventrally; mid tibia without black spinules ventrally.

**Differential diagnosis.** In *D. hormozganiensis* **sp. nov.** the wing has the radial-medial crossvein (r–m) situated beyond the middle of the basal medial cell (bm) and therefore the new species belongs to the *D. exilis* group of species (Chvála, 1975). Amongst the European species of *Drapetis* the new species could be compared with *D. infitalis* Collin, 1961 (Grootaert et al., 2010; Michelsen & Grootaert, 2019). *Drapetis hormozganiensis* **sp. nov.** differs from *D. infitalis* primarily by the simple mid femora. In the latter species the mid femur has a field of short, transverse ribs anteriorly (Michelsen & Grootaert, 2019: figs 5C, E). There are four species of *Drapetis* recorded from the south Mediterranean region and the Middle East that should be compared with *D. hormozganiensis* **sp. nov.** The new species differs from *D. iordaniensis* Raffone (known only from Jordan) by pale setae of the head and thorax (versus black in *D. iordaniensis*), yellowish scape and pedicel of the antenna (versus antenna entirely brown) and by brown tarsomere 5 of the legs (versus legs entirely yellow (Raffone, 2011)). *Drapetis laevis* Becker remains known after a female described from Morocco (Becker, 1914; Kovalev, 1970). A record of this species from Egypt probably belongs to a different species (Collin, 1949). The new species differs from *D. laevis* by longer postpedicel (nearly 2× as long as basal width versus almost as long wide in *D. laevis*), much shorter stylus (2.5× longer than postpedicel versus nearly 6.5× longer than postpedicel) and by the absence of apical setae on

mid and hind tibiae. In addition, *D. laevis* is smaller (body 1.1 mm versus 1.5–1.7 in the new species). *Drapetis bicolor* Collin is one more species known only after a female, but described from Egypt (Collin, 1949). The new species differs from *D. bicolor* at least by longer postpedicel (nearly 2× as long as basal width versus very little longer than wide in *D. bicolor*) and brown tarsomere 5 of legs (legs entirely yellow in *D. bicolor*). *Drapetis pictitarsis* Engel was described from Tunisia but later this species was also recorded from Italy and Iran (Engel, 1939; Raffone, 2007). The new species differs from *D. pictitarsis* by pale setae of the head and thorax (versus black in *D. pictitarsis*) and hyaline wings (brownish yellow anteriorly in *D. pictitarsis*) with longer distance between crossveins bm-m and r-m (nearly 2.5× longer than bm-m versus 1.5× in *D. pictitarsis*).

**Distribution.** Iran (Hormozgan Province).

### Genus *Elaphropeza* Macquart, 1827

*Elaphropeza* Macquart, 1827:86. Type species: *Tachydromia ephippiata* Fallén, 1815, by monotypy.

**Remarks.** *Elaphropeza* is one of the largest genera of the family Hybotidae. The genus has clear circumtropical distribution and currently includes about 230 named species worldwide (Grootaert, 2019; Grootaert & Shamshev, 2012, 2015; Shamshev & Grootaert, 2007). Adult *Elaphropeza* are leaf-dwellers (Grootaert & Shamshev, 2012). *Elaphropeza* is well represented in mangroves of Singapore and Hong Kong (Grootaert, 2019). Two species of *Elaphropeza* were found in this study, including a new species. Formally, *Elaphropeza* is recorded for the first time from the territory of Iran.

### *Elaphropeza mardoensis* sp. nov. (Fig. 3)

<https://zoobank.org/urn:lsid:zoobank.org:act:8257C01E-E29F-4A94-B912-7DBDB913BCC8>

**Type material.** **Holotype** ♂, Iran: Hormozgan Prov., Bandar-e Khamir, Mardo Island, 26°58'33"N, 055°40'25"E, 3 m a.s.l., yellow pan trap, 30.x–2.xi.2021, E. Gilasian (ZISP); **Paratypes:** 9 ♂♂, same data as holotype (HMIM, ZISP).

**Etymology.** The epithet refers to the type locality of the new species, Mardo Island (Hormozgan Province).

**Diagnosis.** Small species (wing 1.6–1.7 mm) of the *E. ephippiata* group; recognised by yellow thorax with scutellum anteriorly and postnotum brown; antennal scape and pedicel yellow, postpedicel mostly brown (yellowish at base), postpedicel nearly 3× longer than basal width, stylus slightly longer than postpedicel; legs almost entirely yellow, only tarsomere 5 brown, hind tibia with 1 anterodorsal seta.

**Description.** — **Male** (Fig. 3A). Wing length 1.6–1.7 mm. Head black, pale setose. Occiput greyish pruinose; vertical setae long, inclinate, yellowish (outer pair somewhat shorter). Anterior ocellars long proclinate, posterior ocellars minute. Frons very narrow, slightly broadened towards ocellar triangle; subshiny above antennae, faintly greyish pruinose below ocellar triangle. Antenna with scape and pedicel yellow, postpedicel mostly brown (yellowish at base), postpedicel nearly 3× longer than basal width; stylus with short pubescence, rather short, slightly longer than postpedicel (1.3–1.4×). Proboscis yellowish. Palpus pale yellow, small, rounded, silvery pubescent, bearing scattered setulae, subapical seta short.

**Thorax.** Yellow but scutellum anteriorly (except upper margin) and entire postnotum brown (sometimes mesoscutum with some slight, brownish yellow markings above wings); mostly shiny, prothoracic sclerites, scutellum and postnotum faintly tomentose; strong setae brownish yellow to yellow. Prothoracic episterna lacking long upturned seta just above fore coxa. Postpronotal seta not prominent. Mesonotal setae: rows of acrostichals and dorsocentrals undifferentiated, scutum evenly covered with numerous pale setulae, 1 pair of very long prescutellar setae; 2 notopleurals, 1 postsutural supra-alar, 1 postalar and 4 scutellars (apical pair very long, cruciate; lateral pair very short). Legs robust, almost entirely yellow, only tarsomere 5 brown. Coxae and trochanters with unmodified setae. Fore femur with rows of rather long anteroventral and posteroventral setae (getting somewhat shorter close to apex), 1 long fine seta near the base. Fore tibia lacking prominent setae (except circlet of short subapicals). Mid femur simple, covered with short, strong setae on about basal 1/3 ventrally, bearing almost complete row of similar but slightly longer posteroventral setae, 1 long fine seta near base and 1 long, strong, brownish yellow subapical seta anteriorly. Mid tibia simple; with incomplete rows (absent close to base)

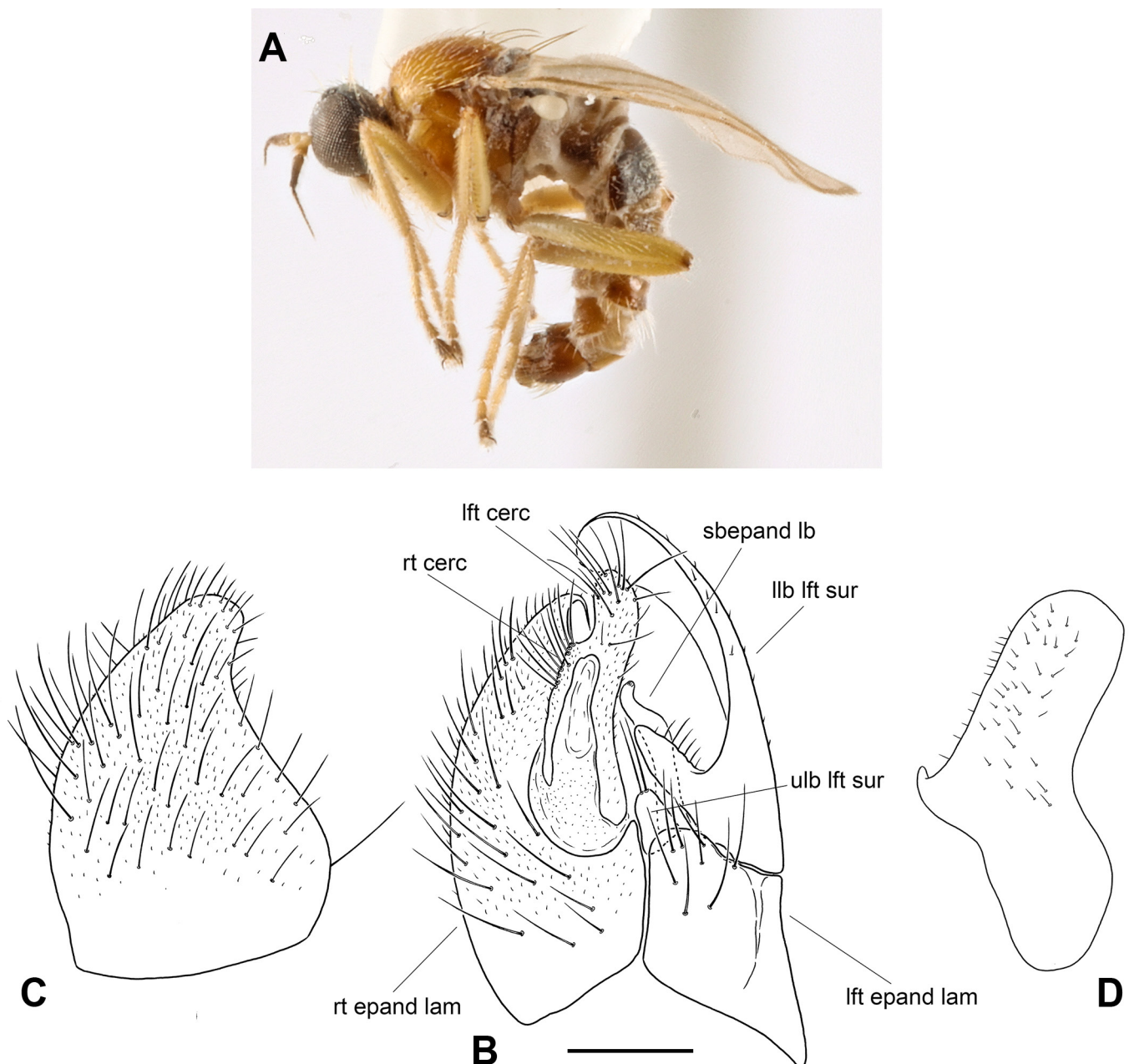
of black, anteroventral and less distinct posteroventral spinules, lacking ventral, subapical, black claw-like spine and prominent setae (except short subapicals). Hind femur with short anteroventrals and 4 erect dorsal setae near base. Hind tibia with 1 anterodorsal, moderately long, brownish yellow setae close to middle; apical projection small, rounded. Tarsi of all legs unmodified; hind basitarsus with slightly longer, stronger brownish setulae anteroventrally. Wing normally developed, hyaline, covered with uniform microtrichia; veins mostly yellowish brown, basal section of  $M_1$ , crossveins  $bm-cu$  and  $r-m$  pale. Costal vein with moderately long, uniform setulae along anterior margin; basal costal seta present, moderately long, brownish yellow. Costal index (proportions of distances between humeral crossvein and  $R_1$  /  $R_1$  and  $R_{2+3}$  /  $R_{2+3}$  and  $R_{4+5}$ , respectively): 1.8/1.8/1. Vein  $R_{2+3}$  gently curved. Veins  $R_{4+5}$  and  $M_{1+2}$  slightly divergent near wing margin, both straight. Vein  $M_4$  not quite reaching wing margin. Vein  $CuA+CuP$  present as short fold. Crossvein  $bm-m$  perpendicular, crossvein  $r-m$  before middle of cell  $bm$ . Squama yellow, with long, brownish yellow setae. Halter pale yellow.

**Abdomen.** Tergite 1 pale yellow; tergites 2–3 brownish yellow, narrow, subtriangular viewed laterally, divided mid-dorsally, with unmodified setae; tergite 4 dark brown, shiny, broadest, with numerous short fine setae and squamiform setae laterally; tergite 5 very narrow, undivided, brownish, with squamiform setae; tergites 6–7 brownish, broader than tergite 5, undivided, with long posteromarginal setae; tergite 8 unmodified. Sternites yellowish, with scattered setulae, sternite 8 with moderately long posteromarginal setae. Gland-like structure present between tergites 4–5. Hypopygium (Figs 3B–D) moderately large, brownish right epandrial lamella somewhat paler at the base. Epandrium completely divided (Fig. 3B). Right epandrial lamella subtriangular (Fig. 3C), covered with numerous, long simple setae. Left epandrial lamella fused to hypandrium, with 7–8 long setae apically; left surstylus represented by two separated sclerites (lobes); upper lobe (close to cerci) small, subtriangular, with 2 long apical setae; lower lobe elongate, moderately broad, sinuate, with short, pointed projection near base dorsally (Fig. 3D), mostly covered with short, fine setae, dorsal projection with stronger setae; subepandrial lobe slender. Cerci narrowly fused (Fig. 3B); right cercus short, very narrower than left cercus, with ordinary setae of different lengths; left cercus moderately long, apical portion digitiform, bearing several long, fine setae. Phallus short. Two rod-shaped apodemes.

**Female.** Unknown.

**Differential diagnosis.** The new species belongs to the *E. ephippiata* group of species (Shamshev & Grootaert, 2007). *Elaphropeza marduensis* **sp. nov.** can be readily distinguished from all known Palaearctic species of *Elaphropeza* primarily by the presence of a single anterodorsal seta on the hind tibia (versus 2 anterodorsal setae) (Chvála, 1971). In having one anterodorsal seta on the hind tibia, the new species could be compared with *E. ralloi* Raffone, 1991 described from Sudan (Raffone, 1991). However, *E. marduensis* **sp. nov.** differs from *E. ralloi* primarily by longer postpedicel (nearly 3× longer than basal width versus 2× longer than basal in *E. ralloi*) and mostly brown scutellum. The new species is closely related to a complex of Oriental species sharing fused cerci (Shamshev & Grootaert, 2007). Within the key to the Oriental species of *Elaphropeza*, the new species would run to *E. riatanae* Shamshev & Grootaert, which is amongst the dominant species in the mangroves of Singapore (Grootaert & Shamshev, 2012). Both species have very similar male terminalia. However, *E. riatanae* has longer postpedicel (nearly 5× longer than basal width) and brown fore tibiae and tarsi. In addition, *E. marduensis* **sp. nov.** resembles *E. ubinensis* Shamshev & Grootaert and *E. feminata* Shamshev & Grootaert (Shamshev & Grootaert, 2007; Grootaert & Shamshev, 2012). The new species differs from *E. ubinensis* primarily by shorter postpedicel (3× longer than basal width versus 4.5× in *E. ubinensis*) and partly brown scutellum (entirely yellow in *E. ubinensis*). *Elaphropeza feminata* (recorded herein from mangroves of Iran, see below) is very similar to the new species. However, *E. marduensis* **sp. nov.** differs from *E. feminata* by partly yellow scutellum, undifferentiated acrostichal and dorsocentral setae, lack of a ventral, subapical, claw-like mid tibial spine in the male and simple female postabdomen. In *E. feminata*, the scutellum is entirely black; acrostichal and dorsocentral setae are arranged in rows, the former are 4–2–serial, the latter are 3–1–serial (from anterior margin of mesoscutum towards scutellum); the mid tibia of the male bears a subapical, claw-like, black spine; the female has a curiously modified postabdomen.

**Distribution.** Iran (Hormozgan Province).



**Figure 3.** *Elaphropeza marduensis* sp. nov., male. **A.** habitus, holotype, dorsal view. **B–D.** hypopygium; **B.** Epandrium and cerci; **C.** Right epandrial lamella, lateral view; **D.** Lower lobe of left surstylus, lateral view. **Abbreviations.** lft cerc: left cercus; lft epand lam: left epandrial lamella; llb lft sur: lower lobe of left surstylus; rt cerc: right cercus; rt epand lam: right epandrial lamella; sbepand lb: subepandrial lobe; ulb lft sur: upper lobe of left surstylus. Scale bars: A. 0.5 mm, B–D. 0.1 mm.

#### *Elaphropeza feminata* Shamshev & Grootaert 2007

*Elaphropeza feminata* Shamshev & Grootaert 2007:107, fig. 180 (female only). Type locality: Singapore, Chek Jawa.

*Elaphropeza feminata*: Grootaert & Shamshev, 2012:101 (male), figs 152–155.

**Material examined.** 2 ♂♂, Iran: Hormozgan Prov., Qeshm Island, Kovarzin, 26°48'39"N, 055°46'38"E, 0 m a.s.l., McPhail trap, 3–4.xi.2021, E. Gilasian; 2 ♂♂, 1 ♀, Iran: Hormozgan Prov., Bandar-e Khamir, Marduo Island, 26°58'33"N, 055°40'25"E, 3 m a.s.l., yellow pan trap, 30.x–2.xi.2021, E. Gilasian (HMIM, ZISP).

**Distribution.** Iran (Hormozgan Province), Singapore.



**Remarks.** *Elaphropeza feminata* is a common species in mangroves of Singapore, which are mainly represented by females (Grootaert & Shamshev, 2012). The female of this species has a curiously modified postabdomen (Shamshev & Grootaert 2007: fig. 238). *Elaphropeza feminata* is recorded for the first time from Iran and from the Palaearctic Realm.

## DISCUSSION

Based on the results of this study, with only four collected species belonging to three genera of the subfamily Tachydromiinae, the mangrove habitats in Iran do not consist of high hybotid species richness. In contrast, the available data show a high hybotid diversity in mangroves of tropical areas of the world. For example, 50 species of the genus *Elaphropeza*, which was a dominant group, were recorded from the faunistic studies carried out in mangroves of Singapore (Grootaert & Shamshev, 2012, 2015). Although, only ten species of *Elaphropeza* were found in mangroves of subtropical Hong Kong (Grootaert, 2019). Unfortunately, nothing is known about the fauna of *Elaphropeza* from mainland Iran. However, it is most probably very poor in species number like other Palaearctic areas. In the absence of more precise observations, it is difficult to conclude about the habitat preferences of the species recorded herein. *Crossopalpus subaenescens* is probably associated with river banks. The two species of *Elaphropeza* are possibly true mangrove species. It is remarkable that one of them (*E. feminata*) was known earlier as a common mangrove species in Singapore. This record may suggest historical faunistic connections between South Iran and Singapore. Morphologically, recorded species of *Crossopalpus* and *Drapetis* have the closest allies amongst the Palaearctic species. However, a new species of *Elaphropeza* is closely related to the known Oriental species (primarily from Singapore). Further studies of the mangrove community in South Iran are needed for more precise conclusions.

## AUTHOR'S CONTRIBUTION

The authors confirm their contribution to the paper as follows: I. Shamshev: conceptualization and microscopic photography, taxonomy, writing – original draft, review and editing. E. Gilasian: conceptualization and microscopic photography, collecting material, writing – original draft, review and editing.

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## AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the Hayk Mirzayans Insect Museum, Iranian Research Institute of Plant Protection (HMIM) and the Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (ZISP) and are available from the curator, upon request.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

## CONSENT FOR PUBLICATION

Not applicable.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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## گونه‌های جدید و گزارش‌های نخست از دوبالان خانواده Hybotidae (Diptera: Tachydromiinae) در رویشگاه‌های مانگرو در ایران

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**چکیده:** دوبالان خانواده Hybotidae (Insecta: Diptera: Empidoidea) برای اولین بار از رویشگاه‌های مانگرو در استان هرمزگان ایران گزارش می‌شوند. چهارگونه از زیرخانواده Tachydromiinae جمع‌آوری شده‌اند که از این تعداد دو گونه *Elaphropeza feminata* Shamshev & Grootaert, 2007 و *Crossopalpus subaenescens* Collin, 1960 برای اولین بار از ایران گزارش می‌شوند. گونه اول از پراکنش وسیعی در خاورمیانه برخوردار بوده ولی گونه دوم تنها از جنگل‌های مانگرو در سنگاپور جمع‌آوری شده است و این اولین گزارش از این گونه برای منطقه Palaearctic می‌باشد. دو گونه *Elaphropeza marduensis* sp. nov. و *Drapetis hormozganiensis* sp. nov. برای دنیای علم جدید می‌باشند. این خانواده در رویشگاه‌های مانگرو در ایران در مقایسه با جنگل‌های مانگرو مناطق تروپیکال از غنای گونه‌ای کمتری برخوردار می‌باشد. از نظر شکل‌شناسی گونه‌های متعلق به جنس‌های *Drapetis* و *Crossopalpus* شباهت بیشتری به گونه‌های منطقه Palaearctic دارند در صورتی که گونه‌های جنس *Elaphropeza* به گونه‌های شناخته شده در منطقه Oriental شبیه می‌باشند.

**واژگان کلیدی:** Palaearctic, *Elaphropeza*, *Drapetis*, *Crossopalpus*, Empidoidea, پراکنش، هرمزگان،