A revision of the genus Pelecocera Meigen with the description of the male of Pelecocera persiana Kuznetzov from Iran (Diptera: Syrphidae)

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Abstract

The genus Pelecocera Meigen (Diptera: Syrphidae) is revised. Type material of most species was studied to describe, illustrate and delimit the male of Pelecocera persiana Kuznetzov, recently discovered from Iran. This is the first known specimen of this species since 1914, when the type female was collected. The diagnostic characters of P. persiana are provided, along with an identification key for Pelecocera species. The lectotype of Pelecocera latifrons Loew is designated.

Key words: Eristalinae, identification key, male description, Rhingiini, lectotype designation

Introduction

Flower flies of the genus Pelecocera Meigen are small in size with a flat, elongate abdomen, usually with an overall dark coloration and yellow markings on the abdominal terga. Their biology is unknown but some species are frequently found in or near dunes and in conifer forest with open ground, such as dry Pinus forest with heathland, or in open areas within Castanea forest (Bartsch et al. 2009; Speight 2013). They are usually encountered on flowers of yellow composites such as Hieracium and Hypochaeris along forest edges, but also visit other genera of plants (Kehlmaier 2002; Van Veen 2004; Speight 2013).

Pelecocera species are rarely encountered in the field (Baugnée 2005; Bartsch et al. 2009), and are consequently infrequent in insect collections. Usually collected in small numbers, some populations are very abundant (Kehlmaier 2002; Popov 2009), but population size can vary from year to year (Reemer et al. 2009, for Pelecocera tricincta Meigen). Pelecocera tricinta is listed as rare (Falk 1991) or threatened (Ssymank et al. 2011), or with data deficient (Maibach et al. 1992), although the distribution of this species in the Palearctic Region is broad (Speight 2013). Popov (2009) lists Pelecocera latifrons Loew as rare for Ukraine.

Pelecocera is characterized by a thick, bare, apical arista, broad and basally expanded basoflagellomere, bare eye, bare metasternum, straight vein R4+5, and crossvein r-m placed before middle of cell dm, and is generally placed in the tribe Rhingiini, which belongs to the Eristalinae (Thompson 1972; Peck 1988; Ståhls et al. 2004).

Pelecocera is similar in overall appearance to Chamaesyrphus Mik, and both taxa are often treated as subgenera of Pelecocera (Thompson & Rotheray 1998; Ståhls et al. 2004; Bartsch et al. 2009; Speight 2013), although some authors prefer to retain both genera (Ståhls & Nyblom 2000; Doczkal 2002; Van Veen 2004; Hippa & Ståhls 2005). The main difference between Pelecocera and Chamaesyrphus is the shape of the arista and its insertion point in the basoflagellomere, i.e. Pelecocera has a very thick arista inserted at the dorsal corner (apex) of the basoflagellomere (apical), while Chamaesyrphus has a relatively thin arista inserted centrally on the dorsal side of the basoflagellomere (subapical). Verlinden (1991) used the shape of vein M1 to separate these genera, saying
that Chamaesyrphus has vein M₁ bent forward gently and reaching vein R₄+₅ at an acute angle, while Pelecocera has vein M₁ bent with a marked posterior angle, and reaching vein R₄+₅ at an almost right angle. This character is variable and not diagnostic, since veins M₁ and R₄+₅ in P. latifrons form an acute angle. Similarly, Pelecocera species have a short vein M₁ that Chamaesyrphus species do not have, but there are exceptions in both taxa as some specimens of P. tricincta have no vein M₁ and the studied specimens of Chamaesyrphus scaevoides (Fallén) has a short vein M₁.

In the present study, we consider Chamaesyrphus and Pelecocera as separate genera. Pelecocera, as defined here, is a small Holarctic genus and comprises only four species (P. tricincta, P. latifrons, Pelecocera pergandei (Williston) and Pelecocera persiana Kuznetzov). Pelecocera pergandei is a Nearctic species, whilst the other three taxa are Palaearctic.

Only P. persiana has been reported from Iran so far. Kuznetzov (1989) described this species based on a single female collected at Tabriz, East Azerbaijan Province, Iran. The aim of the present study is to review the taxonomy of Pelecocera and to describe and figure the male of this very rare species. Moreover, an identification key to the four Pelecocera species is provided.

Material and methods

Terminology follows Thompson (1999) and Mengual (2012). Identification and location labels are indicated in quotation marks (“”), and each line on the label is separated by a double forward slash (//). Handwritten information on labels is indicated in italics.

In the material examined, the collections where the specimens are deposited are indicated between square brackets after each specimen. The abbreviations used for entomological collections follow the standard of the Systema Dipterorum (Thompson 2013), and their equivalents are given here: DDPC: Dieter Doczkal Personal Collection, Germany; MNHN: Muséum National d'Histoire Naturelle, Paris, France; USNM: National Museum of Natural History, Washington D.C., United States of America; TMUI: Insect Collection of the Department of Entomology, Tarbiat Modares University, Tehran, Iran; ZFMK: Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany; and ZMHB: Museum für Naturkunde, Berlin, Germany.

Illustrations were prepared using the software Zerene Stacker 1.04 (Richland, Washington, USA), based on images of pinned specimens taken with a Canon EOS 7D mounted on a P–51 Cam-Lift (Dun Inc., VA, USA) and with the help of Adobe Lightroom (version 5.6). All measurements are in millimeters. Body length was measured in lateral view, from the anterior oral margin to the posterior end of the abdomen. Wing length was measured from the wing tip to the basicosta.

The material of P. persiana used in this study was collected in 2010, using a Malaise trap placed close to the Zereshk road, located on the Southern slope of the Alborz mountain range, Qazvin Province, Iran. The specimen was extracted from the collecting jar and then treated with 100% ethanol for 5 minutes followed by hexamethyldisilazane (HMDS) for 30 min, and finally placed on a glass plate for drying. The dried specimen was then labelled.

Results

Pelecocera persiana Kuznetzov
Figs 1, 3, 4.

Differential diagnosis. Species with almost the entire body densely grey pollinose and the frons broader than eye width in dorsal view. Pelecocera persiana is close to P. latifrons, but differs in the following characters: male with postpronotum yellow (black in P. latifrons), male with scutellum black with pale posterior margin (entirely black in P. latifrons); following Kuznetzov (1989), female with broader frons and differently shaped basoflagellomere. Male genitalia are very similar in these two species and are a bit larger in P. persiana. However, P. latifrons has a slightly larger cercus and a dorsal incision on the surstylus that P. persiana seems to lack (Figs 22, 23).

Description of male. Body length: 7.1 mm; wing length: 5.2 mm. Head (Figs 3, 4). Face produced
anteroventrally, triangular in frontal view, with facial tubercle placed ventrally (tip below ventral margin of eye), yellow-brown medially, darker below antennal insertion point and black along oral margin, with long pale pile on ventral part and on paraface; face densely grey pollinose, very concave between antenna and facial tubercle; gena pale (yellow-brown), black posteriorly, densely grey pollinose with long pale pile; lunule dark brown, shining; frons dark brown, with long pale pile, densely grey pollinose except area around lunule and below vertical triangle, with a depression between anterior ocellus and antenna; vertical triangle raised, broad, scalene, pale pilose; antenna dark brown, basoflagellomere somewhat paler ventrally, dark pilose; ratio scape:pedicel:basoflagellomere = 0.8:1.2:1.7; basoflagellomere broadened dorsally and ventrally, broader than long (Fig. 4), with broad arista with three clearly-defined segments; basoflagellomere and arista microtrichose; eye bare, dichoptic, distance between eyes (3.2 mm at lunule level) broader than eye width; occiput black, grey-silver pollinose, yellowish-white pilose. Thorax (Figs 1, 3). Scutum black, densely grey pollinose except medially, with long pale pile; postpronotum yellow, pilose; notopleuron black, pale pilose; scutellum black with yellow macula on posterior margin, yellow pilose, densely grey pollinose, with pale subscutellar fringe. Pleuron mostly dark brown to black, grey pollinose, with long pale pile on proepimeron, posterior anepisternum, dorsal and ventral katepisternum, and anterior anepimeron; dorsal and ventral pile patches on katepisternum broadly separated; metaepisternum and metasternum bare; calypter yellow, yellow pilose; plumula yellow; halter yellow, capitulum slightly darker; posterior spiracular fringes yellow. Wing. Wing membrane hyaline, stigma brownish; entirely microtrichose. Alula present, as broad as costal cell or a bit narrower, microtrichose. Cell r, open, vein R₄₊₅ straight, and crossvein r-m basal to middle of cell dm. Legs. Coxae black, grey pollinose; trochanters paler, yellowish; femora black, yellow basally and apically; tibiae yellow with a broad black ring; tarsi yellow; mostly yellow pilose. Abdomen (Fig. 1). Broad, flat, unmarginated, grey pollinose, with long pale pile. Tergum 1 black; tergum 2 black with two broad, elongated, yellow maculae not reaching lateral margins, except on anterolateral margin; terga 3 and 4 black with two broad, elongate, yellow maculae not reaching lateral margins, but reaching anterior margin of the tergum; sterna pale, yellow pilose. Genitalia as in Fig. 23 (right surstylus is broken and left surstylus is missing). Female. See Kuznetzov (1989).

Distribution. Iran (East Azerbaijan and Qazvin Provinces).

Material examined. IRAN: Qazvin Province, Zereshk road, 1997 m, 36˚25'10.9''N 50˚06'10.3''E, 06.vii.2011. Leg.: M. Kheirandish [1♂, TMUI].

Remarks. This male specimen was collected approximately 450 km southeast of the type-locality.

_Pelecocera latifrons_ Loew

Figs 2, 5, 6, 7, 10, 11, 17, 19, 20, 21, 22.

Differential diagnosis. Very similar to _P. persiana_, with the body densely grey pollinose and the frons broader than eye width in dorsal view. Male of _P. latifrons_ has postpronotum black and scutellum entirely black, while male of _P. persiana_ has postpronotum yellow and black scutellum with posterior margin yellow; following Kuznetzov (1989), female of _P. latifrons_ has narrower frons and basoflagellomere with an apical extension. Male genitalia are very similar in these two species, but _P. latifrons_ has slightly larger cercus and a dorsal incision on the surstylus that _P. persiana_ seems to lack (Figs 22, 23).

Redescription of male. Body length: 8.6 mm; wing length: 6.2 mm (based on lectotype). Head (Figs 17, 20). Face produced anteroventrally, triangular in frontal view, with facial tubercle placed ventrally (tip at ventral margin of eye), yellow medially, dark below antennal insertion point and facial tubercle and black along oral margin, with long pale pile on ventral part and on paraface; face densely grey pollinose, very concave between antenna and facial tubercle; gena brown-yellow, black posteriorly, densely grey pollinose with long pale pile; lunule dark brown, shining; frons dark brown, with long pale pile, slightly grey pollinose laterally, with a depression between anterior ocellus and antenna; vertical triangle black, pale pilose; antenna dark brown, basoflagellomere somewhat paler ventrally; basoflagellomere broadened dorsally and ventrally, broader than long (Fig. 17), with broad arista with three clearly-defined segments; arista microtrichose; eye bare, dichoptic, distance between eyes broader than eye width; occiput black, grey-silver pollinose, yellowish-white pilose. Thorax (Fig. 20). Scutum black, densely grey pollinose except medially, with long pale pile; postpronotum dark brown, pilose; notopleuron black, pale pilose; scutellum black, yellow pilose, grey pollinose laterally, with pale subscutellar fringe. Pleuron mostly dark brown to black, grey pollinose, with long pale pile on proepimeron, posterior anepisternum, dorsal and ventral
katepisternum, and anepimeron; dorsal and ventral pile patches on katepisternum broadly separated; metaepisternum and metasternum bare; calypter yellow, yellow pilose; plumula yellow; halter yellow, capitulum slightly darker; posterior spiracular fringes yellow.

**Wing.** Wing membrane hyaline, stigma brownish; entirely microtrichose. Alula present, as broad as costal cell or a bit narrower, microtrichose. Cell r̲ open, vein R₄+₅ straight, and crossvein r-m basal to middle of cell dm.

**Legs.** Coxae black, grey pollinose; trochanters paler, yellowish; femora black, yellow basally and apically; tibiae yellow with a broad black ring; tarsi yellow; mostly yellow pilose.

**Abdomen** (Fig. 19). Broad, flat, unmargined, grey pollinose, with long pale pile. Tergum 1 black; tergum 2 black with two broad, elongate, yellow maculae not reaching lateral margins, except on anterolateral margin; terga 3 and 4 black with two broad, elongate, yellow maculae not reaching lateral margins, but reaching anterior margin of the tergum; sterna pale, yellow pilose. Genitalia as in Fig. 22.

**Female.** Similar to male except for normal sexual dimorphism and as follows: face less produced, more oval than triangular in frontal view; frons more shining and less pollinose, broader than male frons; basoflagellomere elongated apically, forming a small process, clearly orange-yellow with dorsoapical portion brown; postalar callus brown, lighter; abdomen entirely brown, without yellow markings, sterna brown.

**Distribution.** From Central Europe (Czech Republic and Hungary) and Balkan Peninsula into European parts of Russia and Near East (Lebanon, and possibly other neighbouring countries).

**Type material examined.**


**Other material examined.** HUNGARY: Bács-Kiskun County, Hild, J. Thalhammer [1♀, ZFMK]; Veszprém County, Tihany, Kiserdő, 17.iv.1983, S. Tóth [1♂, ZFMK]; Békés County, Sarkad, Remetei-erdő, 23.iv.1991, S. Tóth [1♀, DDPC].

**Remarks.** Loew (1856: 46) described *P. latifrons* based on an undetermined number of males from Beirut (Lebanon). These specimens were found in the private collection of I.R. Schiner (Loew 1856: 11). In the ZMHB collection, there is a male from the Loew collection with handwritten labels as above. This male was designated as lectotype of *P. latifrons* by F. Christian Thompson in 1981, although never published. We agree with F.C. Thompson and designate here this male specimen in the ZMHB as the lectotype of *P. latifrons* to fix and ensure the universal and consistent interpretation of the name.

**Pelecocera pergandei** (Williston)

**Differential diagnosis.** *Pelecocera pergandei* has a shiny pleuron, narrow frons, yellow face with a medial black fascia and black gena, and abdominal terga 2–4 with a yellow fascia. It differs from *P. tricincta* by having postpronotum black (yellow in *P. tricinta*) and the male has the eye margins almost parallel on level of frons (approximating each other in *P. tricinta*). For a full description see Williston (1884).

**Distribution.** Single Nearctic species of this genus, occurring from south Ontario in Canada eastwards to New York, and southwards to Mississippi and Georgia in U.S.A.

**Material examined.** USA: Maryland, Rosedale, 10.x.1986, M. Takau [1♀, USNM; USNM ENT 00035261]; Maryland, Glen Echo, 26.ix.1926, N.K. Bigelow [1♂, CNC]; Mississippi, Webster Co., The Cove, T20N, R8E, Sec. 12, 7 mi W Walthall, 19.x–4.11.1988, T.L. Schiefer, malaise trap in mixed mesic forest ravine [1♀, USNM; USNM ENT 00035269].
17. *Pelecocera latifrons*, lectotype male, frontal view (scale: 1 mm).
18. *Pelecocera pergandei*, male, dorsal view (scale: 2 mm).
19. *Pelecocera latifrons*, lectotype male, dorsal view (scale: 2 mm).
20. *Pelecocera latifrons*, lectotype male, lateral view (scale: 2 mm).
22. *Pelecocera latifrons*, lectotype male, lateral view male genitalia (scale: 0.5 mm).
23. *Pelecocera persiana*, male, lateral view male genitalia (scale: 0.5 mm).
**Pelecocera tricincta** Meigen

**Differential diagnosis.** *Pelecocera tricincta* is similar to *P. pergandei* as both have a shiny pleuron, narrow frons and yellow markings on abdomen of both sexes, but it differs from the latter by a yellow postpronotum (black in *P. pergandei*) and male with eyes approximating each other half way between antennal insertions and anterior ocellus (male of *P. pergandei* has almost parallel eye margins). Sack (1932) and Bartsch *et al.* (2009) provide a full description of the species.

**Distribution.** Palaearctic species ranging from Fennoscandia south to Iberia; from Britain (southern England) eastwards through much of Europe (including Italy, northern parts of the Balkans) into European parts of Russia and the Caucasus, through Siberia to Cis-Baikal (Speight 2013).


**Type material of other species originally placed in Pelecocera examined**


*Pelecocera lugubris* Perris: There are three specimens in the MNHN studied by F. Christian Thompson in 1983, which are presumably syntypes (Christophe Daugeron, pers. comm.). None of them represent a different species based on Thompson’s studies, who considers this species as synonym of *Chamaesyrphus lusitanicus* Mik, 1898. Thus, we follow his synonymy (Thompson 2013).

**Key to the species of Pelecocera**

(Translated and modified from Kuznetzov 1989)

1 Pleuron very pollinose: dense pollinosity covering anepisternum, anepimeron, katatergum and meron (Figs 3, 5). Frons broad, broader than eye width (Figs 4, 6, 7). Male with yellow abdominal markings (Figs 1, 2); female without yellow abdominal markings (Figs 10, 11) ................................................................. 3

2 Postpronotum black, slightly pollinose (Figs 14, 16). Male: eye margins almost parallel on frons level (Fig. 18) [Nearctic, East coast] ................................................................. *P. pergandei* (Williston)

3 Male: postpronotum dark (Figs 2, 5, 19); scutellum black (Figs 2, 19, 20). Male genitalia: surstylus with a small incision on the dorsal margin (Fig. 22). Female: frons at level of antennal insertions about 1.5 times broader than eye width (Fig. 7); basoflagellomere with an apical extension (Fig. 2.2 in Kuznetzov 1989) [from Central Europe into European parts of Russia and Siberia] .................................................. *P. tricincta* Meigen

4 Male: postpronotum yellow (Figs 1, 3); scutellum black with yellow fascia on posterior margin (Fig. 1). Male genitalia: surstylus without incision on dorsal margin (Fig. 23). Female: frons at antennal base level about 2.5 times broader than eye width; basoflagellomere not extended apically (Figs 7, 11; Fig. 1.2 in Kuznetzov 1989) [Iran] .......................... *P. persiana* Kuznetzov
Discussion

Kuznetzov (1989) reviewed the Palaearctic species of *Pelecocera* and listed *P. conjungens* Enderlein, *Pelecocera lugubris* Perris, *P. latifrons*, *P. persiana* and *P. tricinta*. In the catalogue of the Palaearctic Diptera, Peck (1988) listed *Pelecocera sareptana* Enderlein, *P. conjungens* and *Ischyroptera annulipes* Lindner as synonyms of *P. latifrons*. The holotype of *I. annulipes* and *P. sareptana* were available for the present study, and we conclude that both types belong to *P. latifrons*. We also studied the holotype of *P. conjungens*, which is conspecific with *Chamaesyrphus lusitanicus* Mik, in agreement with Thompson (2013). Enderlein (1937) already mentioned the possibility of the latter synonym in the original description.

Thompson (2013) also considers *P. lugubris* a synonym of *C. lusitanicus*. The original drawings of *P. lugubris* (Perris 1839) show an apical arista such as in other *Pelecocera* species. Peck (1988) is the last to mention this species, which was originally described from Mont-de-Marsan area, southwest France. No other revisionary European work mentions *P. lugubris* and it is not listed by Speight (2013). Since no other published information exists, and we have not been able to examine the type, we therefore follow Thompson (2013), who studied the material in 1983 (Christophe Daugeron, pers. comm.), and treats it as a synonym of *C. lusitanicus*.

Kuznetzov (1989) described *P. persiana* based on a single female collected in Tabriz on April 6th of 1914. The male here described is the first specimen of this species collected since then, a century ago. These two records and its distribution (*P. persiana* is only known from northern central and northern west parts of Iran) give an idea of the rarity of this species.

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References


