



Parageron raydahensis, New Species and the First Record of Subfamily Usiinae (Bombyliidae: Diptera) from Saudi Arabia

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ABSTRACT

A new species, *Parageron raydahensis* sp. nov. represents the first record of the subfamily Usiinae (Bombyliidae, Diptera) from the Kingdom of Saudi Arabia (KSA) and is the first record of the genus from the Arabian Peninsula. The species was collected from Garf Raydah Protected Area, Abha, Asir Province, southwestern part of the KSA using a Malaise trap set in a site rich in *Juniperus procera*, *Acacia etbaica*, *Olea* spp., other typical Afrotropical trees, and introduced cactus species. This second known record of the genus *Parageron* supports the concept that several southwestern KSA provinces including Asir Province are part of the Afrotropical Region.

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Authors' Contributions

MSA and HMA designed the study, collected and mounted the specimens. MSA identified the specimens. HMA took photos of the study area. MSA and HMA wrote the article.

Key words

Usiini, New species, Arabian peninsula, Asir, Abha, Garf Raydah Protected Area, Afrotropical

INTRODUCTION

Members of the subfamily Usiinae (Bombyliidae) are readily separated from those of closely related bombyliid subfamilies by the flagellum which has a subapical sulcus bearing a style and without dorsal or ventral prongs, and by the absence of vein M_2 (*i.e.*, with three posterior cells); furthermore, members of the genus *Parageron* Paramonov, 1929 are separated from those of other usiine genera by the flagellum which has the subapical sulcus containing only a style and the spine-like arista (spine-like second flagellomere) is absent or fused and bumplike on apical margin of flagellum, also by the female spermathecal reservoir which is obpyriform (Evenhuis, 1990; Greathead and Evenhuis, 2001). (Gibbs, 2014) separated members of *Parageron* by the well-developed anal lobe, which is at least as wide as anal cell, by the pale (white to yellow) hairs throughout, and by the yellowish apical margins of abdominal tergites.

The specimens used in the present study were collected at the Garf Raydah Protected Area, Abha, Asir Province, in southwestern Kingdom of Saudi Arabia (KSA). This is an elevated region above 2000 m.a.s.l with a mean annual precipitation of 253 mm occurring in late winter-early spring and summer. The mean annual temperature of this region is 18.6°C. The area is one of the montane woodlands and evergreen shrub lands of the Arabian Peninsula, with strong Afrotropical affinities (Bussmann and Beck, 1995), predominantly rich in

Juniperus procera Hochstetter ex. Endlicher, *Acacia etbaica* Schweinf, *Olea* spp., introduced cactus species and many other Afrotropical trees, including *Nuxia oppositifolia* (Hochst) Benth., *Maesa lanceolata* Forssk, and *Celtis africana* Burm f. that grow in mesic gullies (Ghazanfar and Fisher, 1998) (Fig. 1).



Fig. 1. Type locality of *Parageron raydahensis* sp. nov. in Garf Raydah Protected Area, Abha, Asir Province, southwestern Kingdom of Saudi Arabia.

The collected specimens did not match any of the Palearctic or Afrotropical species keyed or described in Bezzi (1925), Efflatoun (1945), Engel (1937), Greathead (1967), Paramonov (1947), Yang and Yang (1994), and Zaitzev (1975, 1996).

Crosskey (1980) used the northern boundaries of Yemen as the regional boundary between the Afrotropical and Palearctic portions of the Arabian

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Peninsula. However, other studies considered that southwestern portion of the Arabian Peninsula, including Asir Province of KSA as having a strong Afrotropical influence and may be included in the Afrotropical Region rather than in the Palaearctic Region or the Eremian zone (Sclater, 1858; Wallace, 1876; Holzel, 1998; El-Hawagry *et al.*, 2013; Sharaf *et al.*, 2014; El-Hawagry and Al Dhafer, 2015). Extensive sampling of Diptera in the Arabian Peninsula by John Deeming, Martin Ebejer, Michael Gallagher, and Tony van Harten have raised some interesting questions in respect to the true extent of the Afrotropical Region in this important transitional zone, indicating that Wallace's (1876) concept of the extent of the Afrotropical Arabian Peninsula is more accurate than Crosskey's (1980) narrow concept (Kirk-Spriggs and McGregor, 2009). Adopting the previous concept that Asir Province is included in the Afrotropical Region, this is the second record of the genus *Parageron* from the Afrotropical Region after *P. erythraeus* (Greathead, 1967) that was described from Eritrea. Only 6 species of the genus *Usia* Latreille, 1802, the second genus in the tribe Usiini, are known to be represented in the Afrotropical Region and recorded from Sudan (Gibbs, 2014). Consequently, the distribution of the Afrotropical Usiini is predominantly restricted to north of the Equator in general. The remaining species of Usiini (56 species) are confined to the southern Palaearctic in addition to only one Oriental species (Greathead and Evenhuis, 2001; Evenhuis and Greathead, 2014). Only one species of the subfamily Usiinae, *U. aurata* Fabricius, 1794, has been recorded from the Arabian Peninsula—from Kuwait (Greathead, 1988). The new species described here represents the first record of the subfamily Usiinae for KSA and also represents the second record for the Arabian Peninsula.

MATERIALS AND METHODS

Material for the present study was collected using a Malaise trap and using an aerial sweep net. Apical portions of abdomen of a male and a female paratype were removed and placed in 10% KOH and boiled in a water bath for 20 minutes, and washed with distilled water and transferred to a cavity slide with glycerin for genitalic dissections. Specimens and other structures were photographed by using a LEICA MZ125 stereobinocular microscope fitted with a digital camera (Q-imaging Micro Publisher 5.0 RTV) at the Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, KSA.

Abbreviations of museums

EFC, Efflatoun collection, Entomology Department,

Faculty of Science, Cairo University, Egypt. KSMA, King Saud University Museum of Arthropod Collection, Riyadh, Saudi Arabia.

RESULTS

Subfamily: Usiinae Becker, 1913

Tribe: Usiini Becker, 1913

Genus: *PARAGERON* Paramonov, 1929

Parageron raydahensis, new species

Diagnosis

In the keys of Efflatoun (1945) and Engel (1937) the present species runs to the Palaearctic *P. gratus* (Loew, 1856) excluding species that have been transferred to the genus *Usia* later (Evenhuis, 1990; Gibbs, 2014). However, the lower triangular part of the frons and gena of *P. raydahensis* are bare and not clothed with long erect and tufted black hairs, and neither the ocellar tubercle nor the occiput bear long erect black hairs as in *P. gratus*.

Description

Holotype male (Fig. 2)

Body about 3.2 mm, wing about 3.6 mm, proboscis about 2.5 mm.

Head (Fig. 2C)

Eyes holoptic, contiguous at the upper portion of frons for a distance about 1.5-2.0 times the distinct and triangular lower portion; from profile, lower portion of frons appears sloping forwards at about 45° to the narrow upper portion; frons, gena and narrow face densely silvery dusted and almost bare; occiput black, dusted whitish, with weak whitish hairs becoming longer and coarser at margins; proboscis black, long, about 3 X as long as head or slightly longer; antennae (Fig. 2E) blackish, sparsely dusted whitish, 1st segment approximately as long as broad, 2nd segment compacted, about 1½ X as broad as long, 3rd segment (flagellum) relatively long, about 2 X as long as the first two segments combined, approximately about 3 X as long as its broadest part, the spine-like arista (spine-like second flagellomere) is not entirely absent, it is fused and bumplike on the apical margin of the segment, 1st and 2nd segments sparsely with some short whitish hairs.

Thorax

Black, dusted whitish on pleurae and buff to whitish on scutum; scutum with 4 pronounced dark brownish vittae, lateral ones relatively broader and detached at the suture by coloration and dust of pleura; hairs on thorax

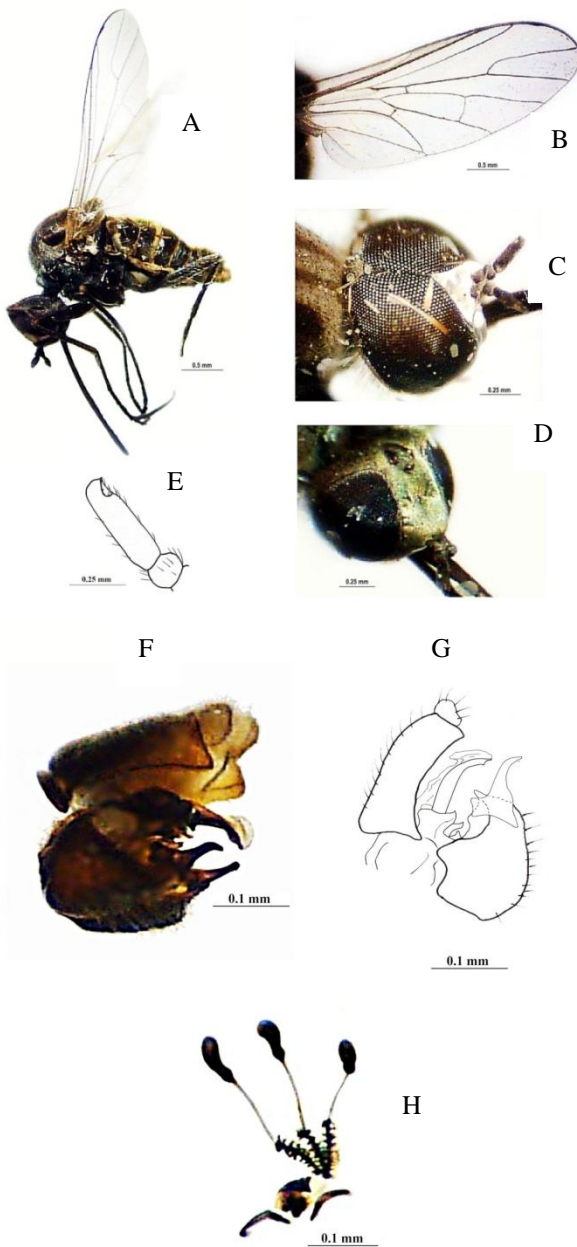


Fig. 2. *Parageron raydahensis* new species. Holotype male habitus, lateral view (A); wing (B); head, fronto-lateral view (C); Paratype female head, fronto-lateral view (D); Holotype male antenna (E); Paratype male genitalia, lateral view (F, G); Paratype female spermathecae (H).

weak, whitish, coarser on pleura and calli; legs predominantly black, sparsely dusted whitish, with tips of femora and adjoining ends of tibiae yellowish, with whitish, weak hairs, relatively longer and coarser on

femora; wings clear with brown to dark brown veins, anal lobe well developed, wider than anal cell.

Abdomen

Dark brown to black, with yellowish apical margins of tergites mostly narrower than width of fore tibia; lateral margins of all tergites dusted whitish to yellowish forming a stripe along each abdominal side; hairs on abdomen sparse, weak and silky whitish.

Male genitalia (Figs. 2F, 2G)

Relatively small, globular; epandrium rectangular when viewed laterally, with whitish hairs; gonocoxites about twice as broad as long, dark brown, with whitish hairs; gonostyli broad with a lateral thumb-like projection basally, and a short spine before the tip of the apical arm; aedeagus sheathed with a membranous sheath that is broad, flattened and dorsally folded at its apical portion capping the aedeagal tip.

Paratype female

As male but dichoptic, with frons about 2½ X width of the ocellar tubercle.

Spermatheca (Fig. 2H)

With bulbs heavily sclerotized, pyriform and elongate; sperm pumps well developed, with large heavily sclerotized papillae, slightly shorter than the narrow apical spermathecal duct and slightly longer than the bulbs.

Material examined

Holotype male

KSA. Asir. Abha. Raydah [1811.884' N, 4224.435'E, Alt. 2387 m], 8.VI.2014, Sweeping net (El-Hawagry) [deposited in KSMA].

Paratypes

1 male, same locality as holotype, 7.VI.2014, Sweeping net (El-Hawagry) [deposited in EFC]; 3 females, same locality as holotype, 7.VI.2014, Malaise trap (Al Dhafer, H; Fadl, H; Abdel Dayem, M; El Turkey, A; El Gharbawy, A) [one deposited in EFC and 2 in KSMA].

Comparative material

2 males and 2 females of *Parageron gratus* Loew, 1856: 1 male, Burg, 5.III.1930, (H.C.E & M.T); 1 male, Mariout, 15.II.1923, (Efflatoun); 2 females, Mariout, 13-16.II.1925, (Efflatoun) [deposited in EFC].

Etymology

The specific name “*raydahensis*” refers to the

locality “Garf Rayhdah” from which the types were collected.

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Statement of conflict of interest

Authors have declared no conflict of interest.

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