A new species of Anteon (Hymenoptera, Dryinidae) from Turkey

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Abstract
A new species from Turkey, Anteon leleji sp. nov. (Hymenoptera, Dryinidae), is described and illustrated. Its relationship with Palaeartic and Afrotropical species of Anteon is discussed. The new species is close to A. xericum Olmi & van Harten described from Yemen, and known also from other Afrotropical countries. The key to the Palaeartic species of Anteon is modified to include the new species. New records of Anteon species from Turkey are registered.

Keywords
Anteon leleji, A. xericum Anteoninae, Chrysidoidea, key, Mugla

Introduction
Dryinidae (Hymenoptera, Chrysidoidea) are parasitoids and often also predators of leafhoppers, planthoppers and treehoppers (Hemiptera, Auchenorrhyncha) (Guglielmino et al. 2013). The family consists of 52 genera (Olmi et al. 2020), including Anteon Jurine, 1807. This genus includes 464 species and is known to parasitize...
leafhoppers of the family Cicadellidae (Olmi et al. 2019). *Anteon* species can be easily recognized for the following characters (see Olmi et al. 2019 for keys and figures): female with distinct ocelli; fore wing with distal part of 2r-rs&Rs vein much shorter than proximal part; chelate protarsus; rudimentary claw absent; inner side of the enlarged claw with a proximal prominence bearing one long bristle; male with three basal cells of the fore wing completely enclosed by pigmented veins; fore wing with PostabR1 (= radius) absent or shorter than pterostigma; pterostigma less than 4 × as long as broad; distal part of 2r-rs&Rs vein much shorter than proximal part; hypopygium not umbrella-shaped.

In the Western Palaearctic region, the genus *Anteon* can be considered sufficiently known in Western Europe mainly because of the papers of Olmi (1999, 2021). On the contrary in Eastern Europe and the Middle East it is insufficiently known due to lack of research (Olmi 2011; Derafshan et al. 2021). In Turkey, the following six species of *Anteon* are known (Olmi and Xu 2015; Olmi et al. 2019): *Anteon abdulnouri* Olmi, 1987; *Anteon ephippiger* (Dalman, 1818); *Anteon infectum* (Haliday, 1837); *Anteon jurineanum* Latreille, 1809; *Anteon pubicorne* (Dalman, 1818); *Anteon scapulare* (Haliday, 1837).

In 2020, we received on loan a specimen of *Anteon* collected in Turkey. It resulted to be a new species described herein.

**Materials and methods**

The description follows the terminology used by Olmi et al. (2019). The measurements reported are relative, except for the total length (head to abdominal tip, excluding antennae and sting), which is expressed in millimetres. The following abbreviations are used in the descriptions: POL – the distance between the inner edges of the two lateral ocelli, OL – the distance between the inner edges of a lateral ocellus and the median ocellus, OOL – the distance from the outer edge of a lateral ocellus to the compound eye, OPL – the distance from the posterior edge of a lateral ocellus to the occipital carina, TL – the distance from the posterior edge of an eye to the occipital carina. The term “disc of metapetal-propodeal complex” is here used in the sense of Kawada et al. (2015). It corresponds to the term “dorsal surface of propodeum” *sensu* Olmi (1984). The term “propodeal declivity” *sensu* Kawada et al. (2015) used here, corresponds to the term “posterior surface of propodeum” *sensu* Olmi (1984). The names of veins of the forewing are here used in the sense of Olmi et al. (2019). The “stigmal vein” (*sensu* Olmi 1984) is here named “second radial-radial sector crossvein & radial sector vein (2r-rs&Rs)”.

The types of all Palaearctic species of *Anteon* have been previously examined by the authors.

The specimens examined in this paper were studied by a stereomicroscope Wild M5. The multifocal photos were taken by one of the coauthors (LC) using a mirrorless camera Sony Alpha 6300 with cross table Proxxon KT 70. Captured images were
merged into a single in-focus image using ZereneStacker version 1.04. Plates were composed by Photoshop CS6. Line drawings were made by a camera lucida combined with a microscope Leitz Laborlux 12.

The specimen studied in this paper is deposited in the collections of the Oberösterreichisches Landesmuseum, Linz (Austria) (OLL).

Results

Genus Anteon Jurine, 1807

Anteon leleji sp. nov.

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Figures 1–3

Material examined. Holotype: ♂, Turkey, Mugla Prov., Mugla university campus, 37°09'38"N, 28°22'11"E, XI.2015–IV.2016, Malaise trap, Barták & Kubík leg. (OLL).

Diagnosis. Macropterous male of Anteon with mesoscutum punctate, unsculptured among punctures (Fig. 1A); propodeal declivity without longitudinal keels (Fig. 1E); paramere with numerous transverse folds and papillae on inner margin (Fig. 2A).

Description. Male. Fully winged (Fig. 1A–C); body length 2.1 mm. Black, except mandible testaceous and antenna and legs brown. Antenna filiform; antennomeres in following proportions: 9:5:6:7:6:6:6:6:6:8 (antennae broken; last four antennomeres glued on the label (Fig. 1E)). Head (Fig. 1D) dull, granulate and slightly rugose; frontal line indistinct, complete; occipital carina complete; POL = 6; OL = 3; OOL = 5; OPL = 3.5; TL = 4; greatest breadth of lateral ocellus about as long as OL. Mesoscutum (Fig. 1A) shiny, punctate, unsculptured. Metapectal-propodeal complex with transverse keel separating disc and propodeal declivity; metapectal-propodeal disc reticulate rugose; propodeal declivity (Fig. 1F) without longitudinal keels, with areolae less wide than those of metapectal-propodeal disc. Fore wing hyaline, without dark transverse bands; distal part of stigmal vein (2r-rs&Rs) much shorter than proximal part (3:7). Paramere (Fig. 2A) without inner process, with numerous transverse folds. Tibial spurs 1/1/2.

Female. Unknown.

Hosts. Unknown.

Etymology. The species is named after Prof. Arkady S. Lelej (Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia) on the occasion of his seventy-fifth birthday.

Distribution. Turkey.

Remarks. Because of the above diagnosis, A. leleji sp. nov. is similar to A. xericum Olmi & van Harten, 2006, species described from Yemen, but Afrotropical, being
known also from Kenya, Madagascar, South Africa and Tanzania (Olmi et al. 2019). From the point of view of Dryinidae, Yemen is mainly Afrotropical. However, there are a few exceptions represented by Palaearctic species, such as *Anteon abdulnouri* Olmi, 1987 and *Echthrodelphax tauricus* Ponomarenko, 1970 (Olmi 1999, 2021; Olmi et al. 2019). For this reason, Yemen is also treated as a Palaearctic country, albeit at the margins (see Olmi et al. 2019 for further comments). Following the above description of *A. leleji* sp. nov., the key to the males of the Western Palaearctic species of *Anteon* published by Olmi (1999), should be modified by replacing couplet 3 as follows:
Figure 2. *Anteon leleji* sp. nov., holotype, male (A) and *A. xericum* Olmi & van Harten, holotype, male (B). A, B genital armature (right half removed). Scale bar: 0.09 mm (A); 0.05 mm (B).

Figure 3. *Anteon xericum* Olmi & van Harten, holotype, male A, B habitus, dorsal view (A), lateral view (B). C head and part of mesosoma (except metapectal-propodeal complex), dorsal view.
1 Short-winged (fig. 98 in Olmi 1999) ......................... A. phoenicium Olmi
– Fully winged (Figs 1A, 3A) ................................................................. 2
2 Propodeal declivity without longitudinal keels (Figs 1F, 3A) .............. 3
– Propodeal declivity with two longitudinal keels (Plates XIV, XVII in Olmi 1999) ................................................................. 8
3 Paramere with numerous transverse folds (Fig. 2A, B) ................ 3’
– Paramere without transverse folds (figs 75, 76B, 77D in Olmi 1999) .... 4
3’ Mesoscutum punctate, unsculptured among punctures (Fig. 1A); paramere without papillae among transverse folds (Fig. 2A) ............ A. leleji sp. nov.
– Mesoscutum completely strongly or very slightly granulate, or at least with anterior half granulate (Fig. 3C); paramere with papillae among transverse folds (Fig. 2B) ......................... A. xericum Olmi & van Harten

Discussion

Species of the genus Anteon usually have very large geographic distributions (Olmi 1999; Olmi et al. 2019). Species that have been recorded from only one country or region are expected to be found in other regions in future. Anteon leleji sp. nov. should not be an exception. As Western Europe is well known, probably A. leleji sp. nov. should be a species present in the Middle East or maybe also in Eastern Europe. The Middle East is insufficiently known. Recent investigations in Iran (mainly thanks to Prof. Ehsan Rakhshani research group, Zabol University, Iran) (Derafshan et al. 2016, 2017, 2020, 2021) are trying to fill this gap. However, the work is hard, since the Middle East covers wide range and the number of involved researchers is too small.

Another big gap regards the hosts of Anteon. They are almost unknown in the entire Middle East. The species, whose hosts are recorded in the Middle East, are only two (Guglielmino et al. 2013).

Following the description of A. leleji sp. nov., eight are the Anteon species recorded in the Middle East (Olmi 1999, 2021; Olmi and Xu 2015; present paper), of which seven registered from Turkey. However, the species present in Turkey are more numerous. We can register here the following six new records, based on material identified by the authors and deposited in OLL:

1. Anteon flavicorne (Dalman, 1818): from Turkey, Samsun, University campus, 41°22’N, 36°11’E, Malaise trap, 22.VI–4.VII.2014, Barták & Kubík leg., 1 ♀ (OLL).
2. Anteon fulviventre (Haliday, 1828): from Turkey, Samsun, University campus, 41°22’N, 36°11’E, Malaise trap, 22.VI–4.VII.2014, Barták & Kubík leg., 1 ♀, 2 ♂ (OLL).
3. Anteon gaullei Kieffer, 1905: from Turkey, Akyaka, 37°03’N, 28°19’E, 30m, IV–V.2013, forest, Barták & Kubík leg., 4 ♂ (OLL).
4. Anteon reticulatum Kieffer, 1905: from Turkey, Samsun, University campus, 41°22’N, 36°11’E, Malaise trap, 22.VI–4.VII.2014, Barták & Kubík leg., 1 ♀ (OLL).
5. *Anteon tripartitum* Kieffer, 1905: from Turkey, Mugla, University Campus, 37°09’N, 28°22’E, 720m, IV.2015, Malaise trap, Barták & Kubík leg., 1 ♀, 2 ♂ (OLL).
6. *Anteon tschirnhausi* Olmi, 2011: from Turkey, Mugla, University campus, 650m, 18–21.V.2011, PT + SW, Barták & Kubik leg., 1 ♀ (OLL); Mugla, University Campus, 37°09.42’N, 28°22.13’E, 700m, 26.V–26.VI.2015, Malaise trap, H. Kavak leg., 1 ♀ (OLL).

Following the above new records, the species of *Anteon* recorded from Turkey are now 13.

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