Review of Aulacidae from Greece and Cyprus with new records

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ABSTRACT

The Aulacidae (Hymenoptera: Evanioidea) from Greece and Cyprus are reviewed. Seven species are recorded, all comprised within the genus Pristaulacus Kieffer, 1900. Two of them, P. chlapowskii Kieffer, 1900 and P. compressus (Spinola, 1808) are reported for the first time from Greece; P. mourguesi Maneval, 1935, previously known from only one locality of northern Greece, is recorded for the first time from the Eastern Aegean islands (Ikaria) and other localities from the Greek mainland are reported; P. galitae (Gribodo, 1879) is recorded for the first time from Lesvos island (Eastern Aegean islands) and Cyprus. Brief references for identification and essential data on the treated species are provided.

KEY WORDS: Aulacidae, Cyprus, Greece, Hymenoptera, identification, new records review.

Introduction

The Evaniomorph family Aulacidae comprises 245 extant species belonging to two genera (Turrisi et al. 2009), Aulacus Jurine, 1807, with 77 species, and Pristaulacus Kieffer, 1900 (including the former Paunalix Benoit, 1984), with 168 species. Both genera are represented in all zoogeographic regions, except Antarctica, while Aulacus is not known from the Afrotropics (Kieffer 1912, Hedicke 1939, Smith 2001, Turrisi et al. 2009). In the Palaearctic, 32 species have been recorded so far, 7 Aulacus and 25 Pristaulacus (Turrisi 2007, 2011, Turrisi et al. 2009, Turrisi and Konishi 2011, Turrisi and Watanabe 2011), of which five are presently recorded from Greece and adjacent islands, most of them having been recorded from this country only in recent time (Turrisi 2007).

Aulacids are parasitoids of wood-boring Hymenoptera (Xiphydriidae) and especially Coleoptera (mostly Cerambycidae and Buprestidae) employing a koinobiont endophagous strategy (Skinner and Thompson 1960, Deyrup 1984, Jennings and Austin 2004). Due to their particular biology, aulacids are not easily observed in their natural habitats and they are not frequently collected by most of the usual collecting methods. As a consequence, many species are known from a few specimens or only one.

The present study deals with new records of Aulacidae from Greece and Cyprus with a review of the distribution of the Aulacidae in these countries, and notes for their identification.

Materials and Methods

This study is based on examination of material preserved in the following museums (curators in brackets):

MRSN Museo Regionale di Storia Naturale, Torino, Italy (Mr. Guido Pagliano).

*corresponding author, e-mail: turrisifabrizio@yahoo.it
NHM The Natural History Museum, London, United Kingdom (Ms. Suzanne Ryder).

NHML National Museum of Natural History, Leiden, The Netherlands (Dr. Frederique Bakker).

NMW Naturhistorisches Museum, Wien, Austria (Mr. Michael Madl).

OLML Oberösterreichisches Landesmuseum, Linz, Austria (Dr. Fritz Gusenleitner).

UCTC University of Catania: G.F. Turrisi collection.

ZSMC Zoologische Staatssammlung München, Germany (Dr. Stefan Schmidt).

The material examined was collected on site by net and partly through Malaise trap. Specimens were studied using Wild M5A light stereomicroscope and measurements were taken with the aid of an ocular scale. High resolution images were taken using a Nikon D70, 6.0 megapixel digital camera. Lighting was achieved through a white plastic light-chamber. Illustrations were obtained by merging an image series, covering different focal planes into a single in-focus image through the freeware CombineZM (Hadley 2008). The final illustrations were post-processed for contrast and light levels in Adobe Photoshop CS2® software in order to enhance clarity and crop the subject. The photographic plates were assembled using CorelDraw X3®.

The distributional data are taken from Turrisi (2007, 2011) and Madl (2012). The species recorded for the first time from Greece and Cyprus are marked with an asterisk (*).

Results and Discussion

Pristaulacus barbeyi (Ferrière, 1933) (Figs 1, 8, 13)

Material examined

One female and one male, Larissa, Anatoli-Spilia, VII-VIII.1990, Zabransky leg. (NMW); 1♂, Elati, 5.VIII.1969, Frank Wilson leg. (NMW); 1♀, Agios, 4-6.X.1969, Frank Wilson leg. (NMW); 1♀, same locality of previous, 4.IX.1969, Frank Wilson leg. (NMW); 1♀, same locality of previous, 16.IX.1969, Frank Wilson leg. (NMW); 2♀, Attika, Mt. Parnitha, 13.VI.1979, Mühle leg. (ZSMC).

Identification

It is a small to medium-sized Pristaulacus-species, with body length (excluding ovipositor for ♀) of 6.7-11.8 mm and fore wing length of 5.1-8.1 mm; the ovipositor length is 1.3x fore wing length in the holotype (examined), but it is variable among the specimens from Turkey (Turrisi 2007). It is readily distinguished by the shape of the head (Fig. 1) with a very narrow cerciniform occipital carina (width less than 0.2x ocellus diameter), the shape of the lateroventral margin of pronotum, rounded and without tooth-like processes (Fig. 8), the tarsal claw bearing two tooth-like processes along the inner margin (Fig. 13), and the short and stocky petiole (Fig. 8) (Turrisi 2007, 2013).

Distribution

Spain (Turrisi 2013), Algeria, Morocco, Greece, Turkey (Turrisi 2007), Iran (Ghahari 2012).

Remarks

This species has recently been recorded from Greece by Turrisi (2007). It is presently known only from the Greek mainland, in the north (Epirus, Thessaly) and central (Attica) regions. Very little is known on the biology of this species: the type specimens were obtained from wood of Abies numidica De Lannoy ex Carrière (Pinaceae) together with an unidentified Coleoptera Buprestidae (Ferrière 1933), whereas the Turkish specimens were obtained together with its potential host, Phaenops knoteki Reitter, 1898 (Coleoptera: Buprestidae) (Turrisi 2007); also the specimens recorded from Iran by Ghahari (2012) were obtained from Abies sp. with unknown Buprestidae.
(**) *Pristaulacus chlapowskii* Kieffer, 1900 (Fig. 2)

**Material examined**
One female, Stratoni, Chalkidiki peninsula, Greece, 40°09′N; 24°17′E, 18-31.VII.2005, E. Migliaccio leg. (UCTC).

**Identification**
*Pristaulacus chlapowskii* is a medium to large species with a body length of 10.6-15.8 mm (excluding ovipositor for ♀) and fore wing length of 7.6-11.0 mm. As *P. galitae*, it has one tooth-like process on each lateral margin of the pronotum, and four well-developed tooth-like processes on the inner margin of the tarsal claw. It can be distinguished from the latter species, by its larger body size, the shape of the head (Fig. 2), the wider occipital carina (0.8x of ocellus diameter) (Fig. 2), and the longer ovipositor (♀), 1.5-1.8x fore wing length (Turrisi 2007). However, small males of *P. chlapowskii* could resemble large males of *P. galitae*, but they are distinguished on the

basis of differential characters reported in Turrisi (2007).

**Distribution**
France, Czech Republic, Hungary, Bulgaria, Russia, Italy (Turrisi 2007), Greece.

**Remarks**
This species is reported from Greece for the first time. It is presently known from only one locality in the Chalkidiki Peninsula, in Northern Greece.

(*) **Pristaulacus compressus** (Spinola, 1808) (Figs 3, 9)

**Material examined**
One female, Kerkini lake, Lithotopos, Northern Greece, 18-24.VII.2006 (UCTC); 2♀, Kerkini lake, Krousia site, 41°11’32.4’’N; 023°03’59.5’’, 190 m a.s.l., 13-19.VI.2007 (NHM).

**Identification**
It is a medium sized species with a body length of 8.8-14.2 mm (excluding ovipositor for ♀) and fore wing length of 6.6-9.5 mm. It is readily distinguished among the other Hellenicaulacid-species for having a wide occipital carina (width equal to ocellus diameter) (Fig. 3), two tooth-like processes on each lateroventral margin of the pronotum (Fig. 9) and the reddish-orange hind tarsus; the ovipositor length is 1.1-1.3x fore wing length (Turrisi 2007, 2011).

**Distribution**
Morocco, Spain, France, Austria, Germany, Switzerland, Italy, Czech Republic, Slovakia, Poland, Romania, Bulgaria, Hungary, former Yugoslavia, Russia (west part), Ukraine, Turkey, Iran, Iraq (Turrisi 2007, 2011), Greece.

**Remarks**
This species is reported from Greece for the first time. It is presently known from only one locality of Macedonia (northern Greece). Several potential hosts are recorded in literature, mostly being Coleoptera Cerambycidae: Xylotrechus arvicola (Olivier, 1795), X. antilopec (Schönherr, 1817), Chlorophorus glabromaculatus (Goeze, 1777), C. pilosus ( Förster, 1771), C. sexgutatus (Lucas, 1849), C. varius (Müller, 1766), Exocentrus punctipennis Mulsant and Guillebeau, 1856 ( Šedivý and Čapek 1988, Campadelli 1998, Turrisi 2007) and one Hymenoptera, Xiphydriidae: Xiphydria longicollis (Geoffroy, 1785) ( Šedivý and Čapek 1988, Campadelli 1998).

**Pristaulacus edoardoi** Turrisi, 2007 (Figs 4, 10)

**Material examined**
Holotype ♀ of Pristaulacus edoardoi, Theriso, Crete island, IX.1985, Schurmann leg. (UCTC); 1♂ paratype, same locality, VI.1984, Schurmann leg. (UCTC); 1♂ paratype, same locality, V.1982, Schurmann leg. (UCTC); 1♀ paratype, Platanias (Volos), central Greece 21.6.2004, K. Standfuss leg. (OLML) (Turrisi 2007).

**Identification**
It is a moderately large-sized species with a body length of 12.6-13.8 mm (excluding ovipositor for ♀) and fore wing length of 9.4 -11.1 mm (Turrisi 2007). It is easily identified by the shape and sculpture of the head (Fig. 4) and sculpture of the mesosoma (Fig. 10), which is shiny with a few carinae (Turrisi 2007). As P. gloriator, it has a narrow occipital carina (width about 0.2x ocellus diameter), pronotum rounded without tooth-like processes (Fig. 10), and four tooth-like processes on the inner margin of the claw; however the head and the mesosoma have a distinctive shape and the ovipositor is quite shorter, 1.0 -1.1x fore wing length (vs. 1.2-1.4x in P. gloriator). Additional distinctive characters are provided by Turrisi (2007).

**Distribution**
Thessaly (Central Greece) and Crete (Turrisi 2007).

**Remarks**
The potential host is Pedostrangalia ariade (Daniel, 1904) (Coleoptera, Cerambycidae) (Turrisi 2007).

(*) **Pristaulacus galitae** (Gribodo, 1879) (Figs 5, 11)
Material examined

One female and one male, Artemisia, Peloponnese, south Greece, 15.V.1999, coll. Ríha (OLML); 1, 1♂, Omalos (Chania), Crete island, 1300 m, 2.VIII.1987, ex larva, from wood of *Berberis cretica* containing *Trichoferus berberidis*, G. Sama leg. (UCTC); 1♂, Omalos (Chania), Crete island, 1000-1500 m, 8.VIII.1989, ex larva, from wood of *Ber-

FIGS 8-14. Morphological features of the *Pristaulacus*-species occurring in Greece and Cyprus (female). 8, mesosoma, lateral view, of *P. barbeyi*; 9, anterior mesosoma, lateral view, of *P. compressus*; 10, mesosoma, lateral view, of *P. edoardoi*; 11, anterior mesosoma, lateral view, of *P. galitae*; 12, anterior mesosoma, lateral view, of *P. gloriori*; 13, tarsal claw of *P. barbeyi*; 14, hind tarsus of *P. mourguesi*. 

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beris cretica containing Trichoferus berberidis, G. Sama leg. (UCTC); 1♂, Vryses NW, Crete island, M. Sárovec leg. (OLML); 1♀, Vlycha NW, Lindos, Rhodos island, 15.X.2002, Martin Schwarz leg. (OLML); 1♀, Parakoila 10 km S of Skala Kallonis, Lesvos island, 16.VI.2008, ex larva, from wood of Nerium oleander containing Trichoferus spartii, D. Dauber leg. (OLML); 1♀, Skala Kallonis, Lesvos island, Meereshöhe, 12-24.VI.2008, ex larva, from wood of Nerium oleander (OLML); 1♀, Aghios Theodoros, Cyprus, 23.VII.1948, G.A. Mavromoustakis leg. (NHM)

Identification
It is a medium-sized species with a body length of 8.0-11.2 mm (excluding ovipositor for ♀) and fore wing length of 4.5-7.8 mm (Turrisi 2007). It is distinguished by the combination of the following features: shape of the head, with rounded profile of temple (Fig. 5), occipital carina moderately wide (0.5x ocellus diameter), one anterior tooth-like process on each side of lateroventral margin of pronotum (Fig. 11), ovipositor length 1.0-1.2x fore wing length.

Distribution
Morocco, Algeria, Tunisia (including Galita island), Spain, Canary islands (Tenerife), France, Germany, Austria, Czech Republic, Slovakia, Bulgaria, Hungary, Romania, Russia, Ukraine, Italy (including Sardinia and Sicily), Croatia, Turkey, Greece (mainland, Crete island and Rhodos island) (Turrisi 2007), recently recorded from Poland (Huflejt and Wiśniowski 2012) and Iran (Ghahari 2012), Cyprus.

Remarks
Recently recorded from Greece mainland, currently known for only the Peloponnesse Peninsula, Crete island and Rhodos island by Turrisi (2007); it is newly recorded from Lesvos island (Eastern Aegean islands) and Cyprus. In literature there are many putative recorded hosts mostly belonging to Coleoptera Cerambycidae: Trichoferus fasciculatus (Faldermann, 1837), Niphona picicornis Mulsant, 1839 (Turrisi 1999); Purgicus kaehleri (Linnaeus, 1758) (Lichtenstein and Picard 1918); Pogonocherus perroudi Mulsant, 1839, Trichoferus berberidis Sama, 1994, T. cisti Sama, 1987, T. spartii (Müller, 1948), Pseudosophesthes cinereus (Castelnau and Gory, 1836), Chlorophorus glabromaculatus (Goeze, 1777). There are two other putative recorded hosts: Scobicia pulsulata (Fabricius, 1801) (Coleoptera, Bostrychiidae) and Denops albofasciatus (Charpentier, 1825) (Coleoptera, Cleridae) (Oehlke 1983).

Pristaulacus glorator (Fabricius, 1804) (Figs 6, 12)

Material examined
Metsovo (Ioannina), 1200 m, 8.VII.1985, 1♀, Casale leg. (MRSN) (Turrisi 2007).

Identification
It is a medium to moderately large-sized species with a body length of 10.2-15.0 mm and fore wing length of 8.2-11.8 mm (Turrisi 2007). It is easily identified by the shape of the head (Fig. 6) with a narrow cerniniform occipital carina (width 0.2x ocellus diameter), a rugulose-carinulate frons, lateroventral margin of pronotum (Fig. 11), ovipositor length 1.0-1.2x fore wing length.

Distribution
Czech Republic, Slovakia, Germany, Hungary, Austria, Romania, Russia, Italy, Albania, Greece, Turkey, Iran (Turrisi 2007), recently recorded from Poland (Huflejt and Wiśniowski 2012).

Remarks
Recently recorded from Greece (mainland) by Turrisi (2007), from which it is presently known for only one mountainous locality of Epirus. It is one of the most common Pristaulacus species in central Europe, but it has a scattered distribution in the Mediterranean countries. Potential hosts are the following Coleoptera: Callidium violaceum (Linnaeus, 1758), Chlorophorus fig-
uratus (Scopoli, 1763), Paraclytus reitteri (Ganglbauer, 1881) (Cerambycidae) (Madl, 1990); Dicerca berolinensis (Herbst, 1779), Chrysobothris igniventris Reitter, 1895 (Buprestidae) (Čapek et al. 1982, Šedivý and Čapek 1988).

(*) Pristaulacus mourguesi Maneval, 1935 (Figs 7, 14)

Material examined
One female, Kleidi ruins, Serres, 15.VI.1992, G. Pagliano leg. (UCTC) (Turrisi, 2007); 1♀, Kerkini lake, Krousia, 41°11'32.4''N; 023°03'59.5''E, 190 m a.s.l., 18-24.VII.2007, Gordon Ramel leg. (UCTC); 1♀, Kourenta, near Hinka, Ioannina, 500 m, 13.VII.1995, Gobbi leg. (UCTC); 1♀, Ploumari, Ikaria, 1.VII.1997 (NHML).

Identification
It is one of the largest species among the Palaearctic Pristaulacus with a body length varying from 16.5 to 18.5 mm, excluding ovipositor for ♀, and fore wing length of 8.8-13.0 mm (Turrisi 2007). It is distinguished by the shape of the head (Fig. 7), the narrow cerciniform occipital carina (width 0.2x ocellus diameter), the hind basitarsus long and slightly curved, 1.5x length of tarsomeres 2-5 (Fig. 14) and the long ovipositor, 1.4-1.6x fore wing length (Oehlke 1983, Turrisi 2007).

Distribution
France, Croatia, Hungary, Greece (Turrisi 2007). There is a generic record for the Near East without material source (Madl 2012).

Remarks
This species has recently been recorded from the Greek mainland (Turrisi 2007), where it is presently known from northern territories; it is newly recorded from Ikaria island (Eastern Aegean Islands, Greece). Its biology is unknown.

Conclusive remarks

Based upon the present contribution, the family Aulacidae in Greece and Cyprus is represented by a total of seven species all included within the genus Pristaulacus. It is noteworthy that most part of the data on Hellenic aulacids comes from the revisionary contribution by Turrisi (2007), and probably new species will be added after careful, targeted investigations. It must be noted that all species are known from only a few records and thus their distribution in Greece are still not satisfactorily known. Moreover, some of these species, widespread in the Mediterranean context, are probably more common in Greece (e.g. P. compressus and P. galitae) than ascertained till now. The identification of the Hellenic species of Aulacidae can be done using the key proposed by Turrisi (2007), recently updated by Turrisi (2011).

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References

Επισκόπηση των Aulacidae της Ελλάδας και της Κύπρου με νέες καταγραφές

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ΠΕΡΙΛΗΨΗ

Στη μελέτη αυτή έγινε επισκόπηση των ειδών της οικογένειας Aulacidae (Hymenoptera: Evanioida) της Ελλάδας και της Κύπρου. Σημειώθηκαν επτά είδη που όλα ανήκουν στο γένος Pristaulacus Kieffer, 1900. Δύο από αυτά, τα P. chlapowskii Kieffer, 1900 and P. compressus (Spinola, 1808) αναφέρονται για πρώτη φορά στην Ελλάδα. Το Pristaulacus mourguesi Maneval, 1935, που είχε αναφερθεί μόνο από μια περιοχή, στην παρούσα μελέτη καταγράφηκε και στο Ανατολικό Αιγαίο (Νήσος Ικαρία) και σε περιοχές της επιφανειακής χώρας. Το Pristaulacus galitae (Gribodo, 1879) αναφέρεται για πρώτη φορά στη Λέσβο και στην Κύπρο. Γίνεται σύντομη αναφορά στην περιγραφή και στην εξάπλωση των ειδών αυτών και αναφέρονται οι ξενιστές τους.