

SPIXIANA	39	1	99–104	München, September 2016	ISSN 0341–8391
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Occurrence of the antlion tribe Acanthaclisini in the Balkan Peninsula

(Neuroptera, Myrmeleontidae)

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Klokočovnik, V., Podlesnik, J. & Devetak, D. 2016. Occurrence of the antlion tribe Acanthaclisini in the Balkan Peninsula (Neuroptera, Myrmeleontidae). Spixiana 39(1): 99–104.

An overview of known distribution and new findings of two antlion species, *Synclisis baetica* (Rambur, 1842) and *Acanthaclisis occitanica* (Villers, 1789), are provided in the Balkan Peninsula. New findings represent the first record of Acanthaclisini tribe in Albania.

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Introduction

The Balkan Peninsula supports a large number of different habitats and represents one of the richest faunas in Europe. This also applies to the Neuroptera fauna (Popov 2007, Popov & Letardi 2010) which was in some parts of the Peninsula insufficiently investigated up to now (Aspöck et al. 1980, 2001). In this paper we provide an overview of the known distribution of two Acanthaclisini species, namely *Synclisis baetica* (Rambur, 1842) and *Acanthaclisis occitanica* (Villers, 1789) with new findings in the Balkan Peninsula. Some information on the biology and ecology of both species is added.

In Europe the Acanthaclisini tribe is represented with only two, above-mentioned species. Larvae and adults of most of the species of the tribe are large and the body of adults is covered with long soft hairs. The larvae are non-pit-builders, moving forward. Only larvae in *Vella* and *Phanoclis* move backwards (Aspöck et al. 2001, Stange 2004, Badano & Pantaleoni 2014).

Genus *Acanthaclisis* Rambur, 1842 is distributed in Palaearctic, and comprises seven species. Larvae have distinctive mandibles, with longest middle

tooth (Aspöck et al. 1980, 2001, Stange 2004, Krivokhatsky 2011). Larvae are able to move backwards or forwards and prefer sand dune habitats with presence of bushes and small trees (Steffan 1975). Genus *Synclisis* Navás, 1919 comprises three Palaearctic species. Larvae move very fast on substrate surface and prefer open sand dune areas with low vegetal cover (Steffan 1975, Aspöck et al. 1980, 2001, Stange 2004, Krivokhatsky 2011, Badano & Pantaleoni 2014).

The first description of the larva of *S. baetica* dates back to the late 19th century when Redtenbacher (1884) provided key morphological characters for the species. Larval morphology was recently figured by Gepp (2010) and Badano & Pantaleoni (2014). Biology of the species is described in detail by Principi (1947). Description of the larva of *Acanthaclisis occitanica* (Fig. 3) provided Brauer (1855) and later Hagen (1859, 1873), Redtenbacher (1884), Steffan (1975) and Gepp (2010). Steffan (1975) studied biology of the species in detail. Stange & Miller (1985) provided systematic review of the tribe Acanthaclisini larvae. Overview with a detailed description of the morphology, biology and distribution of both species has been made in recent papers by Monserrat & Acevedo (2013) and Badano & Pantaleoni (2014). Larval morphology of

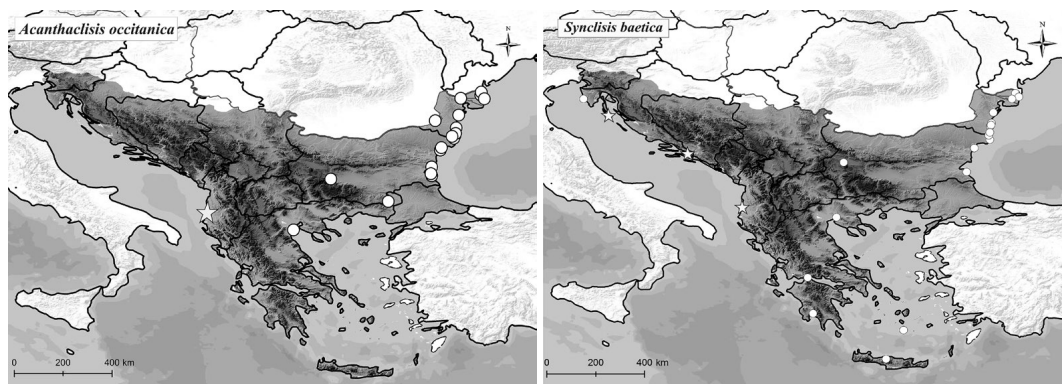


Fig. 1. The known distribution of *S. baetica* and *A. occitanica* in the Balkan Peninsula. Distribution data were obtained from literature. New records reported here are marked with an asterisk.

S. baetica was in the past extensively studied and this antlion species is probably the best known among European non-pit-builders regarding its biology (e.g. Principi 1947, Steffan 1975, Gepp 2010, Badano & Pantaleoni 2014).

In the Balkan Peninsula both species are known for only a few countries. In Bulgaria *A. occitanica* was reported by Dimitrova (1924), Dimitrova (1925), Popov (1977, 1993, 1996) and Kačirek (2013), and *S. baetica* by Dimitrova (1924), Dimitrova (1925), Buresch (1936), Drenski (1942) and Popov (1996). Kis (1959, 1972), Mândru (1967) and Kis et al. (1970) reported on the occurrence of both species in Romania. The species were reported for Greece by Steffan (1975), Willmann (1977) and Navás (1923). *S. baetica* is also known for Croatia (Tröger 1988, Devetak 1998). Steffan (1975) also reported on the presence of *S. baetica* in former Yugoslavia but with no exact location.

Material and methods

Antlion larvae were collected with a spoon from sands in natural habitats and transported in small plastic containers. The larvae were then reared in laboratory. Antlions were kept in plastic cups containing sand from natural habitat and were fed with *Lasius fuliginosus* (Latreille) ants. Photos of larvae were made under a stereoscopic zoom microscope (Nikon SMZ 800) with a mounted digital camera (Nikon DS-Fi2) and processed with NIS-Elements software version 4.00. We followed the zoogeographical categorization of neuropteran fauna of the Balkan Peninsula proposed by Popov and Letardi (2010). The map of the Balkan Peninsula was made with ArcGIS 9.3 computer software program. The north-western boundary of the Peninsula was made in accordance with Popov (1992). Specimens were preserved in ethanol and deposited in the third author's collection.

Results

Distribution of the two antlion species in the Balkan Peninsula

Distribution of both species is shown in Figure 1.

Synclisis baetica (Rambur, 1842)

Literature records

Bulgaria:

Dimitrova (1924) and Dimitrova (1925): Sofia Province: Sofia.

Buresch (1936), Drenski (1942), Popov (1977): Province Varna: Sv. Konstantin; Province Burgas: Arkutino.

Popov (1996): Dobrich Province: Shabla; Dobrudzha.

Croatia:

Tröger (1988): Istra County: Rovinj.

Romania:

Kis (1959): Constanța County: Techirghiol.

Mândru (1967): Constanța County: Mangalia.

Kis et al. (1970): Tulcea County: Letea, Sulina, Caraorman; Constanța County: Agigea, Mangalia, Constanța, Histria, Techirghiol (Dobrogea).

Greece:

Navás (1923): Central Macedonia Region: Thessaloniki ("Salonique").

Steffan (1975): Crete.

Willmann (1977): Thira.

Aspöck et al. (1980, 2001): Central Greece Region and Peloponnese Region.



Fig. 2. Habitat of species *S. baetica* and *A. occitanica* in Divjakë, Albania.

Material examined

Albania: Fier County: Divjakë: Parku Kombëtar Divjakë Karavasta, sand dunes, 40°58.668'N 19°28.682'E, 1.VII.2014, 20 larvae, V. Klokočovník, T. Klenovšek, J. Podlesnik, F. Janžekovič and D. Devetak leg.

Remark: First record for Albania.

Croatia: Ilovik Island, 44°26'52.0"N 14°33'30.0"E, VIII.2012, 1 larva, B. Mencinger Vračko leg. – Dalmatia: River Neretva, Mala Neretva: Blace, 43°00'19.7"N 17°28'16.9"E, 20.VIII.1997, 2 larvae, F. Perović leg.

Zoogeographical categorization: Holomediterranean (expansive northwards).

Acanthaclisis occitanica (Villers, 1789)

Literature records

Bulgaria:

Dimitrova (1924) and Dimitrowa (1925): Pazardzhik Province; Belovo (Rhodope Mountains).

Popov (1977): Burgas Province: Nesebar, Arkutino.

Popov (1993): Burgas Province: Ropotamo.

Popov (1996): Varna Province: Zlatni pyasatsi District, Zlatni pyasatsi; Haskovo Province: Mandrica near Ivajlovgrad.

Kačirek (2013): Dobrich Province: Albena; Burgas Province: Sozopol, Arkutino.

Romania:

Kis (1959): Tulcea County: Letea, Constanța County: Agigea.

Mândru (1967): Constanța County: Mangalia, Comarova, Hagieni.

Kis et al. (1970): Tulcea County: Letea, Periprava, Sulina, Caraorman, Tulcea; Constanța County: Agigea, Mangalia (Dobrogea), Fetești (Muntania), Histria.

Greece:

Aspöck et al. (1980, 2001): Greece: Macedonia Region.

Material examined

Albania: Fier County: Divjakë: Parku Kombëtar Divjakë Karavasta, sand dunes, 40°58.668'N, 19°28.682'E, 1.VII.2014, 1 larva, Klokočovník, Klenovšek, Podlesnik, Janžekovič and Devetak leg.

Remark: First record for Albania.



Fig. 3. Third instar larvae of *A. occitanica* (left) and *S. baetica* (right) from Divjakë, Albania.

Zoogeographical categorization: Holomediterranean (expansive northwards).

Notes on the ecology and behaviour

Larvae of both species collected in Divjakë, Albania were found in an open coastal sand dune area with sporadic low plants of *Juniperus communis*, *Holoschoenus romanus* (= *H. maritimus*) and *Medicago maritima*, with pine forest on one side. Specimens were found individually under the sand at the base of a small, 20–30 cm high *Juniperus communis* plant (Fig. 2). Both species observed are fast runners and they used two different strategies for prey capture, sit-and-wait and sit-and-pursue. Larvae pursued the prey on the substrate surface when the prey was within a distance of a few centimeters.

Discussion

Both European Acanthaclisini species are common for the Mediterranean coast with sand dune habitats with sporadic low vegetation and are expected for all Balkan countries with such habitats. In this paper, the occurrence of *A. occitanica* in the east Adriatic coast is confirmed for the first time. The presence of

antlion species *S. baetica* and *A. occitanica* is reported for the first time in Albania and two new records of *S. baetica* for Croatia are presented. The new findings in Albania increase the antlion species richness in the country from 14 (Devetak et al. 2013) to 16.

Similar results on species behaviour are reported by Principi (1947) who studied the biology of *S. baetica* and Steffan (1975) who studied both species' biology in detail. Among other non-pit-building antlions, predatory behaviour has been studied in detail in a sit-and-wait predator, *Neuroleon microstenus* (Klokočovník & Devetak 2014). Larvae of *A. occitanica* usually use ambush strategy for prey capture, while pursuing the prey is more common in larvae of *S. baetica* (Principi 1947, Badano & Pantaleoni 2014). In contrast to *Neuroleon microstenus* with only one strategy, here we noticed both strategies of prey capture in both species, namely sit-and-wait and sit-and-pursue strategy. Larvae pursued the prey when the prey was within a distance of few centimeters.

Acknowledgements

Authors thank the Ministry of Environment, Forests and Water of the Republic of Albania (Tirana) for permission to collect insects and Ms Elvana Ramaj (the Ministry) for help in issuing the authorization. We thank Danijel

Ivajnsiĉ (Faculty of Natural Sciences and Mathematics, Maribor) for providing the map of the Balkan Peninsula. This research was supported partly by the research project Biodiversity of the Neuropterida in the Balkan (RP BioDiv Neuropterida Balkan – ALBH 2013) and partly by the Slovenian Research Agency within the Infrastructure Programme (Grant No. IP-0552).

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Spixiana, Zeitschrift für Zoologie](#)

Jahr/Year: 2016

Band/Volume: [039](#)

Autor(en)/Author(s): Klokocovnik Vesna, Podlesnik Jan, Devetak Dušan

Artikel/Article: [Occurrence of the antlion tribe Acanthaclisini in the Balkan Peninsula \(Neuroptera, Myrmeleontidae\) 99-104](#)