



**THE BROWN LACEWING *MEGALOMUS TINEOIDES* RAMBUR, 1842  
IN THE BALKAN PENINSULA (NEUROPTERA: HEMEROBIIDAE)**

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**Abstract** - Brown lacewings are insufficiently investigated in the Balkan Peninsula. The brown lacewing *Megalomus tineoides* Rambur, 1842 is reported for the first time for Albania and North Macedonia. The male genitalia, variability of the pattern of the wing markings and natural habitats of this species are illustrated.

**KEY WORDS:** Neuropterida, hemerobiids, Albania, North Macedonia

**Izvleček** – RJAVI MREŽEKRILEC *MEGALOMUS TINEOIDES* RAMBUR, 1842 NA BALKANSKEM POLOTOKU (NEUROPTERA: HEMEROBIIDAE)

Na Balkanskem polotoku so rjavi mrežekrilci (Hemerobiidae) razmeroma slabo raziskani. Poročamo o prvih najdbah vrste *Megalomus tineoides* Rambur, 1842 za Albanijo in Severno Makedonijo. V članku so predstavljeni genitalije samca, variabilnost barvnega vzorca v krilih in naravni habitati vrste.

**KLJUČNE BESEDE:** Neuropterida, rjavi mrežekrilci, Albanija, Severna Makedonija

### **Introduction**

The family Hemerobiidae, brown lacewings, with approximately 550 species, is distributed worldwide (Monserrat 1990, Oswald 1993, Aspöck et al. 2001, Tauber et

al. 2009). Adult brown lacewings are omnivorous, but a major portion of their prey consists of aphids, phylloxerids and spider mites which makes them important in the biological control of pest arthropods (New 1975, Stelzl 1991, Canard 2001, Devetak & Klokočovnik 2016).

In Europe (in the sense of Aspöck et al. 2015) there are 62 brown lacewing species listed, with 43 species in 7 genera in the Balkan Peninsula (Aspöck et al. 2001, Popov & Letardi 2010). The brown lacewing genus *Megalomus* Rambur, 1842 containing approximately 40 species is widely distributed in North and South America, Europe, northern Africa and Asia, but absent from Australia and sub-Saharan Africa (Kimmins 1935, Monserrat 1990, Oswald 1993). In the Balkan Peninsula, the genus is represented by all four European species: *Megalomus tortricoides* Rambur, 1842, *M. hirtus* (Linnaeus, 1761), *M. tineoides* Rambur, 1842 and *M. pyraloides* Rambur, 1842 (Aspöck et al. 2001, Popov & Letardi 2010).

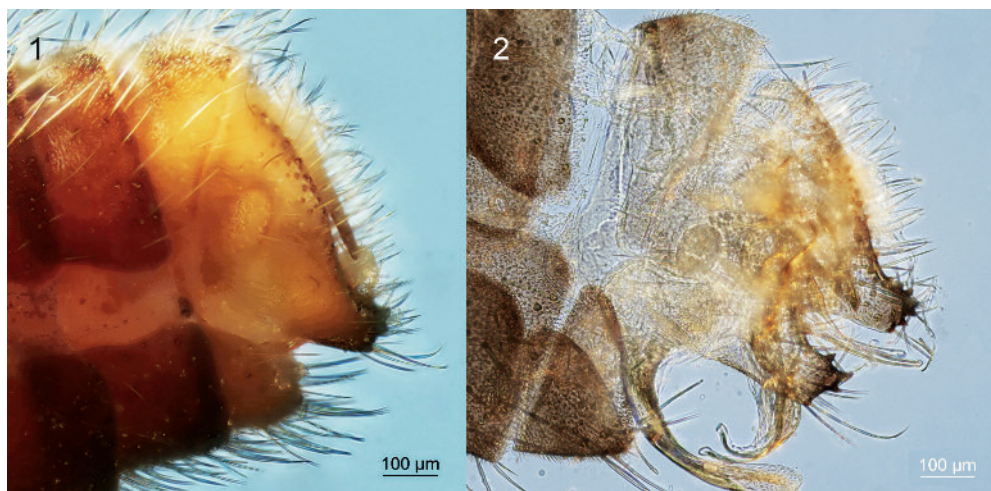
When taking into account the morphology of the male genitalia as a criterion for identification, *Megalomus tineoides* is clearly separated from other three closely related European species (Kimmins 1935, Aspöck et al. 1980, Makarkin 1986). Knowledge of the ecology and distribution of *M. tineoides* is poor; usually only single specimens have been collected. The species is distributed in southern parts of Europe (including south of Switzerland), North Africa and western parts of Asia: Turkey, Armenia and Russian Federation (Dagestan) (Makarkin 1986, Aspöck et al. 2001, Canbulat 2007, Arı 2014). In the Balkan Peninsula *M. tineoides* has been reported in Bulgaria (Dobosz & Popov 2018), Croatia (Aspöck et al. 1980, Devetak 1992a,b), Greece (Aspöck 1962, Aspöck et al. 1980), and Serbia (Podlesnik et al. 2019).

Although the Balkan neuropterid fauna has been studied intensively in recent years (e.g. Devetak & Rausch 2016, Dobosz & Popov 2018, Devetak & Jakšić 2019) the brown lacewing fauna in the peninsula is still poorly known (see Klokočovnik et al. 2014 and Devetak & Rausch 2016 for Albania, Podlesnik et al. 2019 for Serbia). The aim of this study is to present first records of the occurrence of the brown lacewing *Megalomus tineoides* in two countries in Southern Europe and summarize new and existing data on the distribution and ecology for the species in the Balkan Peninsula.

### Material and methods

Specimens were collected using portable light traps with 8 Watt actinic (368 nm) and 8 Watt black light luminescent tubes, all powered by 12 Volt batteries. Additionally, a Finnish tent trap with a 160 Watt MV bulb at the top of the pole and a 20 Watt (368 nm) black light lamp over the catching pot below were used. An additional 20 Watt (368 nm) lamp was also positioned about 70 m from the tent trap. All traps ran throughout the night.

Specimens were preserved in 70% ethanol and deposited in the first author's collection. Reliable identification of *Megalomus*-specimens is only possible by means of examination of male genitalia (Figs. 1,2). Genital preparations of voucher specimens were made by clearing the apex of the abdomen in saturated KOH solution. For identification we used the fundamental literature: Aspöck et al. (1980), Makarkin (1986).



**Fig. 1.** Male genitalia of *Megalomus tineoides*, Demir Kapija, North Macedonia. Photo: D. Devetak.

**Fig. 2.** Male genitalia of *M. tineoides*, Mt. Mali me Gropë, Albania; 5-6 denticles are visible at the tip of the ectoproct. Photo: D. Devetak.

Photos of the genital preparations and the wings were taken with a stereoscopic zoom microscope Nikon SMZ 800 with a mounted digital camera Nikon DS-Fi2 and processed with NIS-Elements D 4.20 software (Nikon, 2011). The map of distribution of the species was created with RStudio (2020) using the ggplot2 (Wickham et al. 2020) and ggmap (Kahle et al. 2019) packages.

## Results

### *Megalomus tineoides* Rambur, 1842

#### Literature records

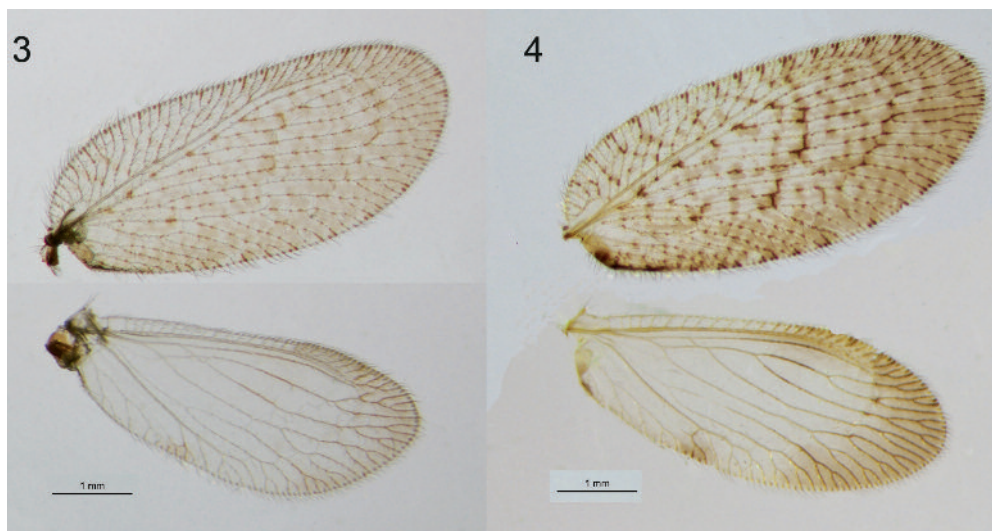
Aspöck (1962): Greece: Litochoro. Aspöck et al. (1980): Croatia: Split; Greece: Crete. Devetak (1992b): Croatia: Split. Dobosz & Popov (2018): Bulgaria: Struma Valley: Skakavitsa Railway Station; Sandanski; Karlanovo: NE of Melnik; Melnik; Black Sea Coast: Obzor. Podlesnik et al. (2019): Serbia: Trnava village near Preševo.

#### Material examined (Figs. 1-4)

In a period 2015-2019 a total of 25 males were collected in Albania, North Macedonia and Serbia.

#### Albania:

Dibër County; Mt. Thanës, near Bulqizë town, above Plani i Bardhë village, 767 m, 41°28'34.3"N 020°09'19.4"E, 30.IX.2018, 3 ♂, leg. A. Nahirić & S. Beshkov.



**Fig. 3.** Wings of *M. tineoides*, Preševo, Serbia with typical light pattern of the wings. Photo: D. Devetak.

**Fig. 4.** Wings of *M. tineoides*, Demir Kapija, North Macedonia with darker pattern of the wings. Photo: D. Devetak.

Fier County: near Ardenica monastery, above Kolonjë town, 127 m, 40°49'35.4"N 019°35'17.5"E, 2.XI.2018, 3 ♂, leg. A. Nahirnić & S. Beshkov.

Gjirokaštër County: Përmet municipality, near Benjë-Novoselë village, 437 m, 40°14'39"N 020°25'22"E, 20.X.2017, 1 ♂, 2 ♀, leg. A. Nahirnić & S. Beshkov.

Lezhë County: Munellë Mt., above Mesul village, 1400 m, 41°56'56.8"N 020°05'33.4"E, 7.VII.2019, 1 ♂ (darker individual), leg. A. Nahirnić & S. Beshkov.

Shkodër County: Bjeshkët e Nemuna Mts. (=Prokletije Mts), Malësi e Madhe municipality, above the Cemi Selcës river valley near Gropat e Selcës village, 1236 m a.s.l., 42°32'26"N 019°41'45"E, 16.VIII.2018, 2 ♂, leg. S. Beshkov, A. Nahirnić & C. W. Plant.

Tirana County: Dajt Mt., Qafa e Mollës Pass, 675 m, 41°21'51.5"N 019°57'55.7"E, 1.XI.2018, 1 ♂, leg. A. Nahirnić & S. Beshkov; 30.IX.2019, 1 ♂, leg. A. Nahirnić & S. Beshkov.

Tirana County: Mt. Mali me Gropë (=Mt. Mali me Gropa), southern slopes, northwest from Burimas village above Shëngjergji village (Fig. 5), 1400 m a.s.l., 41°21'11.34"N 020°02'38.23"E, 13.VIII.2018, 1 ♂, leg. C.W. Plant & S. Beshkov.

Vlorë county: Ionian Sea Coast, Palasë village near Dhërmi, 274 m, 40°10'35"N 019°36'21"E, 6.VI.2016, 2 ♂, leg. A. Nahirnić & S. Beshkov.

First records in Albania.

Serbia:

Preševo town, 2 km W Trnava village, 696 m, 42°16'33"N 021°36'57"E, light trap, 18.IX.2015, 1 ♂, A. Nahirnić & S. Beshkov leg.



#### North Macedonia:

Vardar Region: Demir Kapija, Besvica village E, gorge of Besvički dol river, 255 m, 41°22'58"N 022°11'45"E, light traps; 05.V.2017, 1 ♂; 28.X.2018, 6 ♂; 13.VII.2019, 3 ♂; all A.Nahirić & S.Beshkov leg. (Fig. 6).

First record in North Macedonia.

Distribution of the species in the Balkan Peninsula is shown in Fig. 7.

In Demir Kapija, North Macedonia, two dozen *Megalomus*-females and a few males of *Megalomus tortricoides* were also collected. Some of the females were typical for one of the two species, but the identity of the rest was uncertain, due to the co-occurrence of the two species.

#### Variability of the wing pattern

A male from the site at Preševo, Serbia has wings with light markings, typical for *M. tineoides* (Fig. 3). In contrast, a male from Mt. Mali me Gropë, Albania and most of males from North Macedonia (Fig. 4) have much darker pattern of the wings which is not a typical characteristic for this species.

#### Ecology

In Mt. Mali me Gropë, Albania the male was collected on the southern slopes of the mountain, characterized by dry rocky grasslands with sporadic shrubs and screes, limestone (Fig. 5). In Mt. Thanës, Albania *M. tineoides* was collected on dry rocky grasslands on serpentinites. Near Ardenica, Albania it was collected in maquis. In Mt. Munellë, Albania its habitat was mountain grasslands on limestone.



**Fig. 5.** Dry rocky grasslands with sporadic shrubs, Mt. Mali me Gropë, Albania. Photo: A. Nahirić.

**Fig. 6.** Pseudomaquis and rocky grasslands with sporadic shrubs, vicinity of Besvica village, Demir Kapija, North Macedonia. Photo: A. Nahirić.



**Fig. 7.** The present known distribution of *M. tineoides* in the Balkan Peninsula. Orig. D. Devetak.

In Demir Kapija, North Macedonia *M. tineoides* occurred in dry rocky grasslands, pseudomaquis and transition from dry rocky grasslands with sporadic shrubs to pseudomaquis, i.e. mixed sclerophyllous evergreen and deciduous shrub thickets consisting of Mediterranean and sub-Mediterranean xerophilic shrubs and small trees (in Demir Kapija: *Fraxinus ornus* L., *Juniperus excelsa* M. Bieb., *Juniperus oxycedrus* L., *Palmyris spina-christi* Mill., *Pistacia terebinthus* L., *Phillyrea latifolia* L., and *Quercus pubescens* Willd.) (Fig. 6).

Beshkov & Nahirnić (2016) described the habitat at the collecting place near Preševo, Serbia as conforming to the Serbian EUNIS habitat classification (Lakušić et al. 2005) as E1.2B2 [Serpentine Steppe on shallow, rocky soil] in a forest belt of *Quercus pubescens* Willd. and *Q. petraea* (Matt.) Liebl. and thickets as a result of degradation of that forest.

## Discussion

In this paper, the occurrence of the brown lacewing *M. tineoides* in Albania and North Macedonia is confirmed for the first time. The distribution of this species in Bulgaria has been mapped very recently by Dobosz & Popov (2018).

In various parts of Europe, this species occurs on shrubs and rarely on trees, especially on oaks (*Quercus*) (Aspöck et al. 1980). In fact, *M. tineoides* is the species that does not reveal correlation with any plant specific substrate species (Monserrat & Marín 1996), it is collected mostly at light. In this paper, the habitats of the species, i.e. dry grasslands and mixed sclerophyllous evergreen and deciduous shrub thickets (pseudomaquis) in North Macedonia and serpentine steppes in Serbia are described in detail.

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