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NEUROLEON MICROSTENUS (MCLACHLAN, 1898) (NEUROPTERA: MYRMELEONTIDAE) IN NORTHWESTERN PART OF THE BALKAN PENINSULA

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ABSTRACT

Results of the study of the antlion species Neuroleon microstenus *are described and figured. Distribution of the species in the northwestern part of the Balkan Peninsula and some information on biology of the species are presented. The species was found for the first time in Slovenia and the distribution in Croatia and Montenegro was confirmed. Two dark pigmented spots in forewings are characteristic for the species. The length of distal spot varies and comprises an area of 2-4 cross-veins. The only known finding-place in Slovenia has been destroyed and consequently the species seems to be extinct there.*

Key words: *Neuroleon microstenus*, antlions, Neuroptera, ecology, endangerment, Balkan Peninsula

NEUROLEON MICROSTENUS (MCLACHLAN, 1898) (NEUROPTERA: MYRMELEONTIDAE) NELL'AREA NORD – OCCIDENTALE DELLA PENISOLA BALCANICA

SINTESI

Nella parte nord – occidentale della penisola balcanica, la specie di formicaleone Neuroleon microstenus *è diffusa in Slovenia, Croazia e Montenegro. La specie si distingue per le chiazze scure sulle ali anteriori. La lunghezza della chiazza distale varia; la chiazza copre un'area che va da due a quattro nervature trasversali. La popolazione presente in Slovenia è minacciata; vengono presentati alcuni dati relativi al suo habitat. Nell'unico luogo di insediamento noto in Slovenia, la specie è stata sterminata.*

Parole chiave: *Neuroleon microstenus*, formicaleoni, Neurotteri, ecologia, minaccia, penisola balcanica

INTRODUCTION

The antlions, Myrmeleontidae, are well known even to non-entomologists due to their unique method of capturing their prey. In pit-building species, the larva digs a conical pit in sand or loose soil and then waits for prey at the bottom of the pit.

Antlions occur in warmer parts of the world; the Mediterranean Basin is one of their distribution centres.

The genus *Neuroleon* Navás, 1909 includes small antlions and is confined to Africa, southern Europe and large parts of Asia (Hölzel, 1986). There are about 120 valid species of the genus, but only two of them occur in the western part of the Balkan Peninsula (Aspöck *et al.*, 2001). Till now, both Balkan species – *Neuroleon microstenus* (McLachlan) and *Neuroleon egenus* (Navás) – have been reported from Croatia (Devetak, 1992a, b). Knowledge of ecology and distribution of *Neuroleon* species is poor; usually only single specimens have been collected in European countries. The only exception in this respect is France, where Steffan (1971) studied ecology and distribution of the genus in detail. The larva of *N. microstenus* lives in sand without constructing pits (Gepp, 1974; Gepp & Hölzel, 1989).

N. microstenus is a polycentric Mediterranean species (for review of distribution see Aspöck *et al.*, 2001). Morphology of the first instar larvae was described by Gepp (1974). *N. microstenus* can easily be distinguished from other *Neuroleon* species following key-characters (Aspöck *et al.*, 1980). Among the other characters, abdomen of males of this species is much longer than the wings.

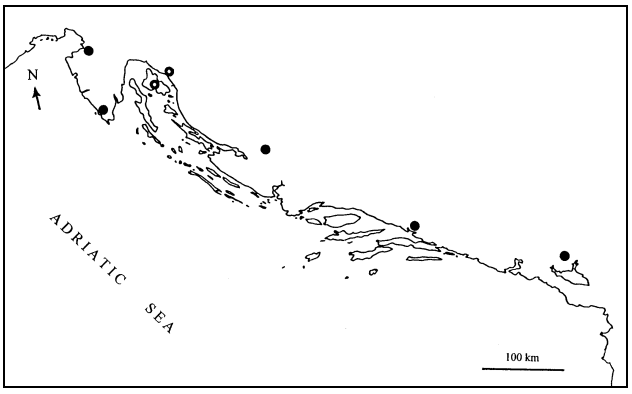

Fig. 1: Collecting places of** Neuroleon microstenus **in the northwestern part of the Balkan Peninsula. Localities with individuals collected before 1950 are marked with open circles (o).
Sl. 1: Razširjenost volkcev vrste** Neuroleon microstenus **v severozahodnem delu Balkanskega polotoka. Lokalitete s primerki, nabranimi pred letom 1950, so prikazane s praznimi krogci (o).

In 2001, *N. microstenus* was found in Slovenia. Very little is known about the habitat preference of this species. According to Aspöck *et al.* (1980), the species occurs in forests or macchia; our finding in Slovenia does not confirm this as, contrary to this, the species is linked to an open area devoid of trees and bushes.

In this paper, the distribution of *N. microstenus* in the northwestern part of the Balkan Peninsula and some information on biology of the species are presented.

MATERIAL AND METHODS

Fluid-preserved and dried specimens are deposited in the Natural History Museum, Zagreb, Croatia (coll. Museum ZG) and in the first author's collection (Maribor).

Wing morphology was examined microscopically. Habitat temperatures were measured with digital thermometers Cresta and Checktemp, Hanna Instruments.

RESULTS AND DISCUSSION

Distribution in the northwestern part of the Balkan Peninsula

Literature records: Devetak (1992b): Croatia: Novi, Krk, Stoja

Material examined (m – males, f - females)

Slovenia: Koper, Srmin 7.VIII.2001 3m 8f, D. Devetak leg.; 17.VIII.2001 1f P. Devetak leg.

Croatia: Pula, Stoja 10.VIII.1983 1m, D. Devetak leg.; Novi VIII.1939 1m (coll. Museum ZG); Krk: Krk VIII. 1949 1m (coll. Museum ZG); Obrovac, Golubić, rijeka Krupa 8.VIII.1984 1f, M. Franković leg. (coll. Museum ZG); Ploče, Blace 3.VIII.1996 1f F. Perović leg., 1f G. Gjerapić leg. (coll. Museum ZG).

Montenegro: Tuzi 12.VIII.1982 2f, 15.VIII.1982 1m 2f, 24.VIII.1092 2m 1f, 27.VIII.-4.IX.1982 4f, 5.-17.IX. 1982 2f; all F. Janžekovič leg.

The finding places in the northwestern part of the Balkan Peninsula are shown in figure 1.

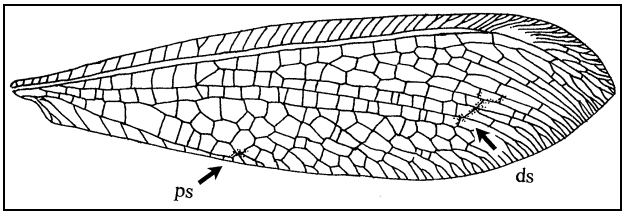

Fig. 2: Right forewing of** Neuroleon microstenus **(Golubić, Croatia). The proximal (ps) and distal spots (ds) are marked with arrows. The wing is 22 mm long.
Sl. 2: Desno sprednje krilo volkca vrste** Neuroleon microstenus **(Golubić, Hrvaška). Proksimalna (ps) in distalna lisa (ds) sta označeni s puščicama. Dolžina krila je 22 mm.

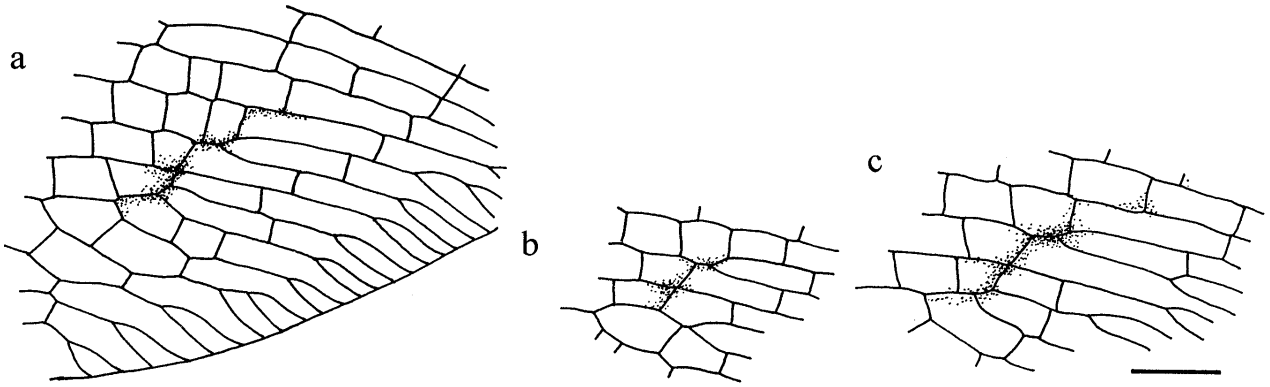

Fig. 3: Variability of the distal spot in right forewings: a, b – females from Srmin near Koper (Slovenia); c – male from Tuzi (Montenegro). Bar: 1 mm.
Sl. 3: Variabilnost distalne lise v desnih sprednjih krilih: a, b – samici s Srmina pri Kopru; c – samec iz Tuzija (Črna gora). Merilo: 1 mm.

Wing morphology and pigmentation

Forewings are shown in figures 2 and 3. Two dark pigmented spots are characteristic of this species, the proximal and distal ones. The length of the distal spot varies and comprises an area of 2-4 cross-veins (Fig. 3). However, we did not note geographically correlated variability.

Fig. 4: Dry eroded flysch slopes at Srmin near Koper (Slovenia) in August 2001. This collecting place is now destroyed.
Sl. 4: Suha in erodirana flišnata pobočja hriba Srmina pri Kopru v avgustu 2001. Ta lokaliteta je danes uničena.

Remarks on the habitat

According to Aspöck *et al.* (1980), the typical habitats of the species are forests or macchia. In Croatia (Stoja in the vicinity of Pula), the species originates from macchia, while in Slovenia (Srmin near Koper) *N. microstenus* populated an area devoid of vegetation (Fig. 4). In this place, numerous individuals were observed on August 2001 flying along dry eroded flysch slopes. The maximal ground temperatures (1 cm depth) in Srmin in summer reached 62 °C and the maximal air temperature 50 °C (200 cm height, 17 August 2001) (Tab. 1). Despite the extremely high temperatures, antlions were still actively flying.

Endangerment in Slovenia

During 2002 and 2003, the only known finding-place in Slovenia was destroyed as material excavated during road construction was deposited in Srmin and the eroded flysch slopes were filled up. The species seems to be extinct in Slovenia.

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Tab. 1: Air and sand temperatures in Srmin (near Koper, Slovenia) at different depths on two clear days in August 2001 and June 2003.
Tab. 1: Temperature zraka in peska v Srminu pri Kopru v različnih globinah med dvema sončnima dnevoma avgusta 2001 in junija 2003.

Date/Time	Sand temperatures			Air temperatures	Weather conditions
	surface	1 cm depth	10 cm depth	200 cm height	
17 Aug 2001					
11:55	41	45	-	31.5	Cloudy day, no wind
12:00	46.5	48	-	35	Clear day, no wind
12:40	50	49	-	38	Clear day, no wind
13:15	52	62	-	50	Clear day, no wind
10 Jun 2003					
11:30	55.6	55.7	40.5	37.2	Clear day, light wind
11:45	56.6	53.7	40.5	37.2	Clear day, light wind
11:50	54.5	55.3	40.1	37.2	Clear day, light wind
12:00	57.3	57.7	40.5	35.8	Clear day, light wind
12:15	58.0	57.3	-	-	Clear day, light wind
12:20	58.1	56.1	43.4	35.5	Clear day, light wind
12:30	58.3	56.6	43.6	37.7	Clear day, light wind
12:45	57.1	56.4	43.6	37.2	Clear day, light wind
12:50	60.3	59.4	44.1	38.5	Clear day, no wind

NEUROLEON MICROSTENUS (MCLACHLAN, 1898) (NEUROPTERA: MYRMELEONTIDAE) V SEVEROZAHODNEM DELU BALKANSKEGA POLOTOKA

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POVZETEK

Vrsta volkcev Neuroleon microstenus *je v severozahodnem delu Balkanskega polotoka razširjena v Sloveniji, na Hrvaškem in v Črni gori. Za vrsto sta značilni temno pigmentirani lisi v sprednjih krilih. Dolžina distalne lise variira; lisa pokriva območje od dveh do štirih prečnih žilic. Za populacijo, ki živi v Sloveniji, navajava ogroženost in nekaj podatkov o habitatu. Na edinem znanem slovenskem nahajališču je vrsta iztrebljena.*

Ključne besede: *Neuroleon microstenus*, volkci, Neuroptera, ekologija, ogroženost, Balkanski polotok

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