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Solenosthedium bilunatum (Heteroptera: Scutelleridae) at the Adriatic Coast of Croatia

Solenosthedium bilunatum (Heteroptera: Scutelleridae) an der Adriaküste Kroatiens

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Summary: Nowadays, online social media provide rich insight into natural history and the distribution of many living beings. Based on citizen records uploaded to Facebook, we confirm the presence of the shield bug *Solenosthedium bilunatum* (Lefèbvre, 1827) in Croatia. *S. bilunatum* is a remarkable Mediterranean scutellerid within the subfamily Elvisurinae, with its distribution core in Southern Europe, the Middle East and North Africa. The species was recorded in Croatia only once prior to our study, in 2000 in Vela Luka on the Adriatic island of Korčula. We report the species from three additional localities in Dalmatia: Kaštel Lukšić (recorded in 2018 and 2019), Split (recorded in 2019) and Mount Srđ above Dubrovnik (recorded in 2019). The species has either been neglected or is rare. Due to global warming, it could spread its distribution area towards north.

Key words: Elvisurinae, new records, citizen science, Facebook, distribution, Mediterranean region.

Zusammenfassung: Heutzutage liefern soziale Onlinenetzwerke einen tiefen Einblick in die Naturkunde und die Verbreitung vieler Lebewesen. Basierend auf im Rahmen von Bürgerwissenschaft auf Facebook hochgeladenen Nachweisen von *Solenosthedium bilunatum* (Lefèbvre, 1827) bestätigen wir die Präsenz der Art in Kroatien. *S. bilunatum* ist eine bemerkenswerte mediterrane Schildwanze innerhalb der Unterfamilie Elvisurinae mit einer Hauptverbreitung in Südeuropa, dem Nahen Osten und Nordafrika. Die Art wurde in Kroatien bisher erst einmal nachgewiesen, im Jahr 2000 in Vela Luka auf der Adriainsel Korčula. Wir melden die Art von drei weiteren Orten in Dalmatien: von Kaštel Lukšić (Nachweise 2018 und 2019), Split (Nachweis 2019) und dem Berg Srđ oberhalb von Dubrovnik (Nachweis 2019). Die Art wurde bisher entweder vernachlässigt oder ist selten. Aufgrund des Klimawandels könnte sie ihr Verbreitungsgebiet nordwärts ausdehnen.

Schlüsselwörter: Elvisurinae, neue Nachweise, Bürgerwissenschaft, Facebook, Verbreitung, Mittelmeerregion.

Sažetak: Društvene mreže danas značajno doprinose proširenju spoznaja o rasprostranjenosti brojnih živih bića, a upravo je na Facebook-u pronađena fotografija stjenice *Solenosthedium bilunatum* (Lefèbvre, 1827) kojom se potvrđuje njezina prisutnost u Hrvatskoj. *S. bilunatum* je zanimljiva sredozemna vrsta koja pripada porodici Scutelleridae, potporodici Elvisurinae. Nastanjuje južnu Europu, Bliski istok i sjevernu Afriku, a u Hrvatskoj je prvi put pronađena 2000. godine u Veloj Luci na Korčuli i to je do sada bio njezin jedini nalaz. Vrstu smo pronašli na tri dodatne lokacije u Dalmaciji, ovaj put na kopnu – 2018. i 2019. u Kaštel Lukšiću, a 2019. u Splitu i na Srđu iznad Dubrovnika. Ne možemo još reći je li vrsta previđena ili rijetka, ali možemo očekivati da će joj se sa globalnim zagrijavanjem areal povećavati.

Ključne riječi: Elvisurinae, novi nalazi, građanska ili neprofesionalna znanost, Facebook, rasprostranjenost, Sredozemlje.

1. Introduction

Solenosthedium bilunatum (Lefèbvre, 1827) is a relatively large shield bug, 12 to 16 mm in length, variable in coloration, but still easily recognizable by its iridescent reddish and dark coloration with two large pale colored "moons" on the scutellum, which may be missing in some specimens (Matocq & Pluot-Sigwalt 2002; Gogala 2008). It is the only European representative of the subfamily Elvisurinae, which is of afrotropical and oriental origin, as well as of the genus *Solenosthedium* Spinola, 1837 (Göllner-Scheiding 2006). *S. bilunatum* is a Mediterranean species distributed in Southern Europe, the Middle East and North Africa. In Europe, it has been reported from Croatia, Cyprus, Greece, Italy (mainland, Sicily, Sardinia), Malta, Portugal, Spain and the French island of Corsica (Josifov 1986; Matocq & Pluot-Sigwalt 2002; Göllner-Scheiding 2006; Gogala 2008). The species is polyphagous and feeds on various plants belonging to different families, such as lentisk, terebinth (*Pistacia* spp.), American pepper (*Schinus molle* L.) (Anacardiaceae), strawberry tree (*Arbutus unedo* L.) (Ericaceae) and quince (*Cydonia oblonga* Mill.) (Rosaceae) (Matocq & Pluot-Sigwalt 2002; Gogala 2008).

2. New records of *Solenostedium bilunatum* from the Dalmatian coast

Gogala's (2008) record of *S. bilunatum* from Vela Luka on the island of Korčula was the first confirmed record of the species in the Balkan peninsula, but the author claims that the feeding plant was not observed nearby. Lentisk (*Pistacia lentiscus* L.), terebinth (*Pistacia terebinthus* L.) and strawberry tree (*A. unedo*) are however widespread in Dalmatia, including Korčula (Nikolić 2015). Thus, there is a lot of opportunities for the species to feed on. We add three localities (see Tab. 1 and Fig. 1) to the knowledge of the distribution of this peculiar species in the Balkans: Kaštel Lukšić, Split and Mount Srđ above Dubrovnik. Three specimens were observed in Kaštel Lukšić (one on 5th December 2018 (Fig 1.2A), another one on 16th May 2019, and the third one on 31st October 2019 (Fig. 1.2B)). In Kaštel Lukšić there is a quince tree (*C. oblonga*) in the garden in which the specimens were found; the host plant, we suppose. A single specimen was observed in Split on 9th August 2019 (Fig. 1.3). In Dubrovnik, a single specimen was observed on 22nd November 2019 (Fig. 1.4) on the southern exposition of Mount Srđ, this one on a strawberry tree (*A. unedo*). The specimen from Dubrovnik was collected

Tab. 1: List of four known localities of *Solenosthedium bilunatum* (Lefèbvre, 1827) in Croatia, together with coordinates, elevation, date of observation, and name of observer.
Tab. 1: Auflistung der vier bekannten Fundstellen von *Solenosthedium bilunatum* (Lefèbvre, 1827) in Kroatien mit Koordinaten, Höhe über dem Meeresspiegel, Datum der Beobachtung und Name des Beobachters.

Locality	Coordinates		Elevation	Date	Observer
1. Korčula Isl., Vela Luka	N42.957570	E16.714928	0–20 m	15.-18. VIII.2000	Tomi Trilar (Gogala 2008)
2. Kaštel Lukšić	N43.555049	E16.354683	14 m	5.XII.2018 16.V.2019 31.X.2019	Antonija Novak Morić (this study)
3. Split	N43.506628	E16.463823	14 m	9.VIII.2019	Jadranka Škorput (this study)
4. Dubrovnik, Mount Srd	N42.638600	E18.135800	249 m	22.XI.2019	Matea Martinović (this study)

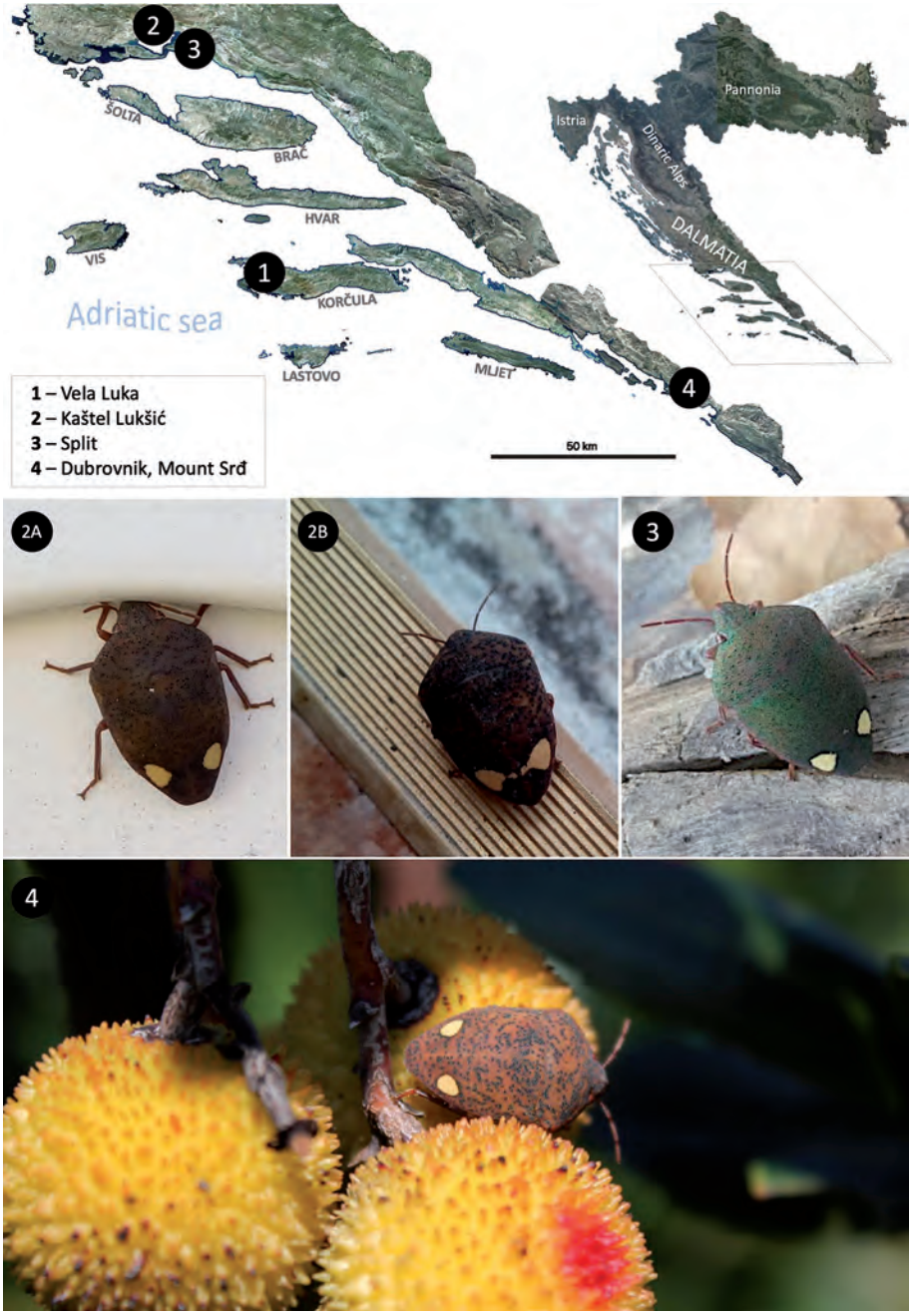

Fig. 1: Distribution of *Solenosthedium bilunatum* (Lefèbvre, 1827) in Croatia. Photos correspond to numerated localities. **1** First published record of the species from Korčula Island, Vela Luka (Gogala 2008); **2** Kaštel Lukšić records (2A from 2018, 2B from 2019, photos: A. Novak Morić); **3** Split record (photo: J. Škorput); **4** Dubrovnik, Mount Srđ record (photo: M. Martinović), specimen sitting on a strawberry tree, *Arbutus unedo* L., the host plant.
Abb. 1: Verbreitung von *Solenosthedium bilunatum* (Lefèbvre, 1827) in Kroatien.

and is deposited in the Dubrovnik Natural History Museum (PMD). The specimens from Korčula (Gogala 2008), Kaštel Lukšić and Mount Srđ are more reddish than the specimen from Split, which has a metallic green coloration.

As global temperature increases, southern species move their ranges northward (Pavlović 2019). *S. bilunatum* is definitely a Southern Mediterranean species and the population in Croatia represents the northernmost border of its distribution area. It is unknown if *S. bilunatum* has been present, but overlooked, in Croatia for a longer time period or if it is a recent immigrant. Some tropical bugs are known to have established populations and became invasive in Europe and Croatia (Šapina & Šerić Jelaska 2018). Global warming definitely *is* one of the major forces that will shape species distribution in decades to come, and maybe *S. bilunatum* could be a charismatic bug model in assessing those changes in the Adriatic area.

3. Guidelines for future studies

Taken into account that, beside the island of Korčula (Gogala 2008), the species was reported from uncertain localities in Greece (Josifov 1986), the new records reported in this paper contribute greatly to the knowledge of the species in the Balkans. The species may also be present in Bosnia and Herzegovina (at least in the Adriatic part of the country, including Neum Pass), in the coastal part of Montenegro as well as in Albania.

It would be interesting to check (by molecular methods) if specimens found in Vela Luka, Kaštel Lukšić, Split and on Mount Srđ belong to a recently founded population or if the species was really overlooked in Croatia in the past.

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