ÖGH Herpetozoa
Austrian Herpetological Society

Herpetozoa 35: 77–80 (2022)
DOI 10.3897/herpetozoa.35.e78714

First record of the Diadem Snake, *Spalerosophis diadema* (Squamata, Colubridae) for Lebanon

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Academic editor: Yurii Kornilev ♦ **Received** 30 November 2021 ♦ **Accepted** 28 February 2022 ♦ **Published** 5 April 2022

Abstract

We report the first record of the Diadem Snake, *Spalerosophis diadema cliffordii* (Schlegel, 1837) for Lebanon, based on an adult male found in the semi-desert area of the Beqaa Valley. This record increases the number of species of reptiles for Lebanon to 52, with the family Colubridae now comprising 17. The record also highlights the Beqaa Valley as a promising, but currently insufficiently investigated area for further herpetological research due to its biogeographic connection to the large semi-desert and desert areas of Syria.

Key Words

Middle East, Levant, distribution, faunistics, diversity

Lebanon is a small country with a high species and habitat diversity, but herpetologically still insufficiently investigated. Thus, further efforts are necessary for studying species composition, distribution and genetic diversity of local amphibians and reptiles to better understand their evolutionary history and taxonomy in a wider, Middle Eastern context. Lebanon is located in the Levant Region that is characterised by the highest reptile richness and endemism in the Western Palearctic (Ficetola et al. 2018). However, our herpetological knowledge is still limited in Lebanon, including species mapping and genetic diversity (cf. Tamar et al. 2015; Jablonski and Sadek 2019a, b). Despite the long herpetological research tradition in the wider region (e.g. Böttger 1880; Zinner 1967), it was only a genetic approach that allowed, for example, the discovery of the second species of the tree frog *Hyla felixarabica* Gvoždík, Kotlík, Moravec, 2010 in Lebanon (Dufresnes et al. 2019). In addition, several morphologically well-recognised species of herpetofauna [(e.g. *Myriopholis macrorhyncha* (Jan, 1860), *Platyceps rogersi* (Anderson, 1893)] are expected to be present, but have not yet been reported in Lebanon despite their confirmed presence in the surrounding areas (cf. Sindaco et al. 2013; Bar et al. 2021).

Although the family Colubridae in Lebanon is represented by 16 species and eight genera, the distribution of some of them within the country is still not clear (genus *Eirenis*; Sindaco et al. 2013). The presence of the Diadem snake, *Spalerosophis diadema* (Schlegel, 1837), a widely distributed species in the Western Palearctic, is also unclear in Lebanon. Although the species is listed as part of the snake fauna of Lebanon in some sources (e.g. Disi et al. 2001), it has not been confirmed by field observations, nor museum voucher specimens. It is the only member of the genus in Western Asia with a very unstable subspecific taxonomy comprising of three taxa: *S. d. diadema* (India, Pakistan), *S. d. cliffordii* (Schlegel, 1837) from Mauritania to Turkey and Iran and *S. d. schirasianus* (Jan, 1863) mostly from central and south Asia (Marx 1959; Baig and Masroor 2008). The subspecies *S. d. cliffordii* is known from both neighbouring countries of Lebanon (Sindaco et al. 2013), yet it has never been recorded inside Lebanon despite the availability of

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potentially suitable habitats. Here, we report on the first record of *S. diadema* for Lebanon.

An adult male *S. diadema cliffordii* (Fig. 1A–F) was killed by local people and then collected by Wihad Dandich on 2 June 2021, near the village of Ras El Assi (راس العاصي), Hermel area, Beqaa Valley, north-eastern Lebanon (34.3342°N, 36.4017°E, datum WGS84; elevation 736 m; Fig. 2A, B). The specimen was found in an open dry semi-desert area with condensed sandy soil and rocks and with small agricultural fields scattered around (Fig. 1H). Small rocky valleys with caverns and invaginations in the walls are present in the wider vicinity that represents a suitable habitat for the species (e.g. Disi et al. 2001).

The specimen was immediately frozen for further examination under the voucher number LW-R-001/2021 and is stored in 70% ethanol in the collection of the Lebanese Wildlife NGO, Beit Meri, Matn, Lebanon. The snout-vent length (SVL) of the specimen is 1,100 mm with 204 ventral scales, tail length (TL) is 210 mm with 73 subcaudal scales. The weight of the specimen is 460 g. The length and weight were measured by tape and digital scales after the snake was frozen. The colouration and the pattern are typical for *S. diadema cliffordii* (Marx 1959; Schätti et al. 2009; Fig. 1A), comprising brown blotches on a light, sandy-orange background. Ventral scales are light with reddish places. The colouration of the body and eyes, however, changed partly due to preservation in ethanol.

Starting in the spring of 2018, we conducted 13, one or two-days long field trips to the area. Day, as well as night surveys, were conducted. Reptile species recorded in the Hermel area of the Beqaa Valley, where the specimen of *S. diadema* was found, were *Trapelus ruderatus* (Olivier, 1804) (Agamidae), *Mesalina microlepis* (Angel, 1936), *Ophisops elegans* Ménétries, 1832 (both Lacertidae), *Eumeces schneiderii pavimentatus* (Geoffroy De St. Hilaire, 1827) (Scincidae), *Telescopus nigriceps* (Ahl, 1924), *Eirenis* aff. *coronella* (Schlegel, 1837), *Dolichophis jugularis*

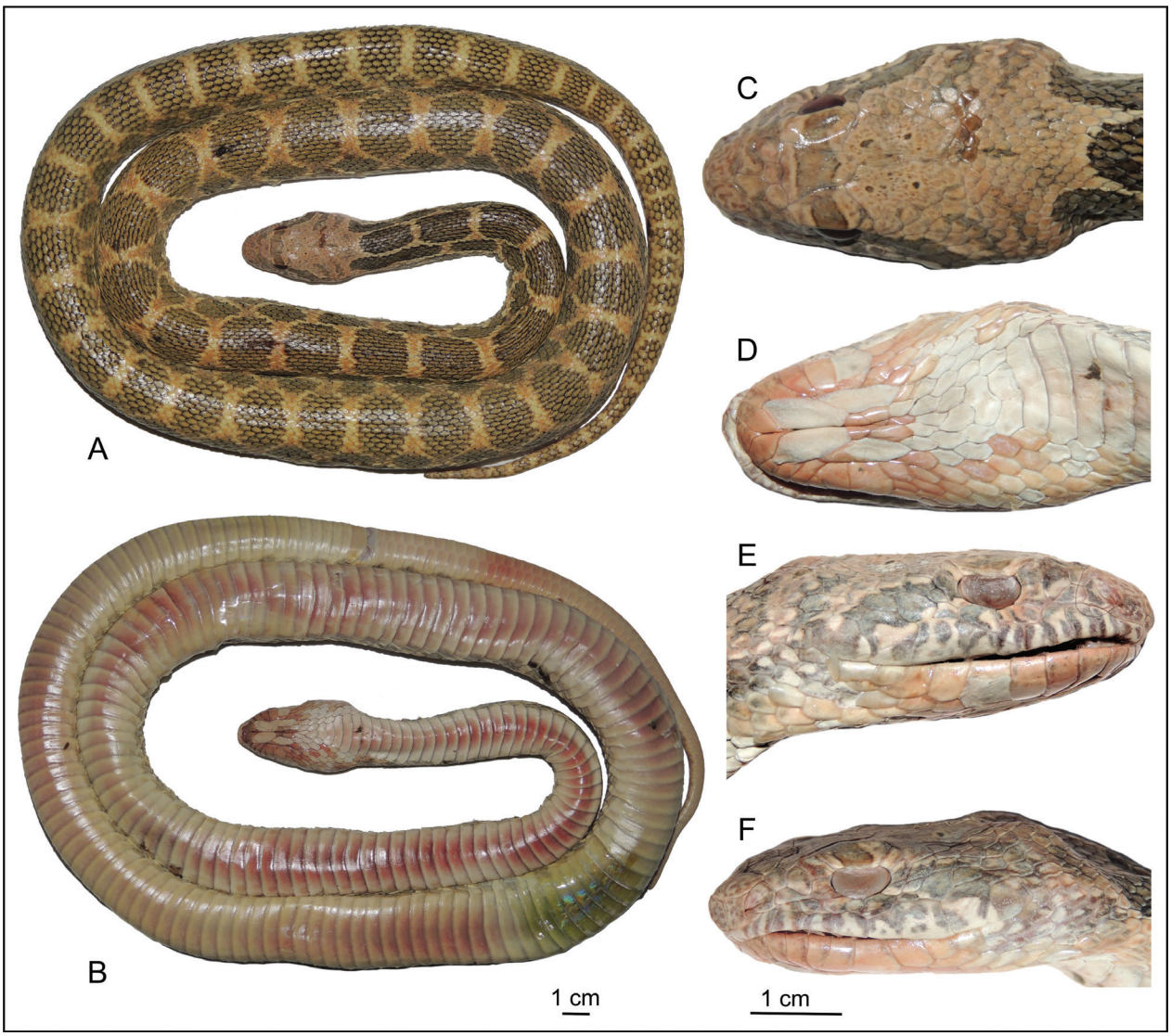

Figure 1. The specimen of *Spalerosophis diadema cliffordii* from Lebanon. **A, B.** The dorsal and ventral view of the body; **C–F.** Detail views of the head.

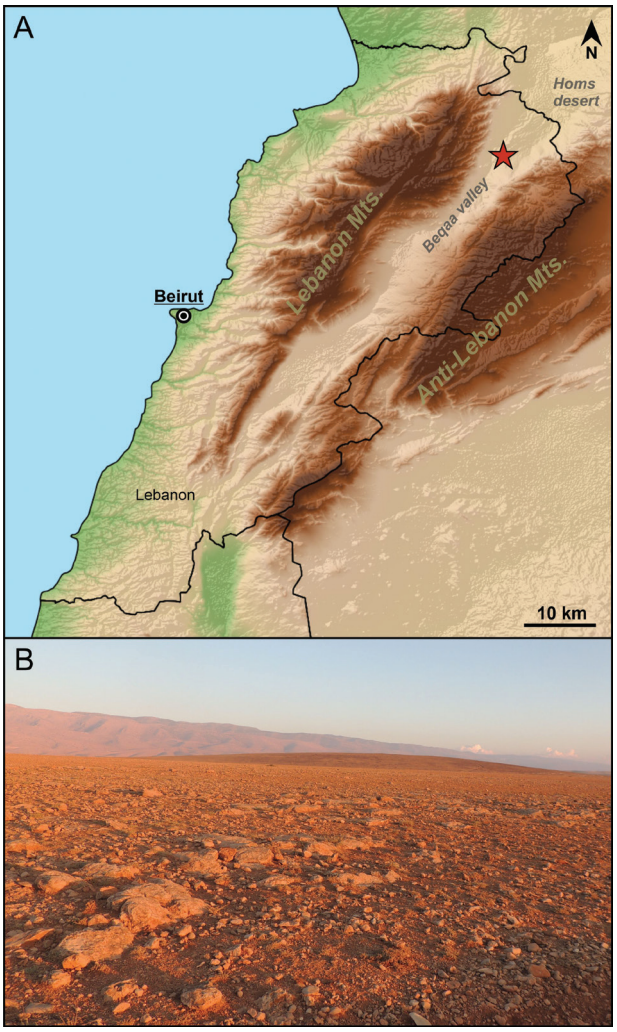

Figure 2. A. The map of Lebanon indicating the position of the record (red star); **B.** The habitat where the specimen of *Spalerosophis diadema cliffordii* was found.

(Linnaeus, 1758) (all Colubridae), *Malpolon insignitus* (Geoffroy Saint Hilaire, 1827) (Psammophiidae), and *Testudo graeca* Linnaeus, 1758 (Testudinidae) (Bosch et al. 1998; Hraoui-Bloquet et al. 2002; Jablonski and Khashab, pers. obs.). According to our observations, dense rodent holes present in the locality provide good shelter for some reptiles, including *S. diadema*. In these shelters, we also found snake sheds from *D. jugularis*, *M. insignitus*, as well as other, unidentified snake species, possibly *Platyceps* sp. Our record of *S. diadema* thus increases the number of species of reptiles for Lebanon to 52, with the family Colubridae now comprising 17 (cf. Mahlow et al. 2013; Sindaco et al. 2013; Jablonski and Sadek 2019a).

In the Levant Region that lies between the Nur Mountains and the Sinai Peninsula, *S. diadema* is found in semi-desert to desert habitats, rocky slopes or border rocky areas near sandy dunes (Disi et al. 2001; Werner 2016; Bar et al. 2021). The semi-desert areas of Lebanon (continuing from dry areas of the Homs Desert in Syria) are limited only to the northern part of the Beqaa Valley (Fig. 2A) that coincides with the edge area of the range of several other species of reptiles with affiliation to such environment, for example, *Trapelus ruderatus*, *Eumeces schneiderii pavimentatus* or *Mesalina microlepis* (see Hraoui-Bloquet et al. 2002). Thus, the reason why *S. diadema* was recorded for Lebanon only now is most probably due to the small-size of suitable habitats limited to the northern part of the Beqaa Valley and limited research in the area due to the overall region's poor accessibility connected with the security situation. However, the Beqaa Valley represents probably an important biogeographical corridor for reptile species inhabiting arid environments connecting to Syrian deserts and thus provides the potential for newly-recorded species in Lebanon.

Acknowledgements

We thank Wihad Dandich for his help during the fieldwork. We thank two anonymous reviewers and the editor for their comments. This study was supported by the grant of the Scientific Grant Agency of the Slovak Republic VEGA 1/0242/21.

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Zeitschrift/Journal: Herpetozoa

Jahr/Year: 2022

Band/Volume: 35

Autor(en)/Author(s): Khashab Rami, Jablonski Daniel

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