

## New records of the Awl-headed Snake (*Lytorhynchus diadema*) from northeastern Morocco

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*Lytorhynchus* Peters, 1862 is a genus of non-venomous snakes distributed from the Atlantic coast of North Africa eastward to the western Indian frontier (Sindaco et al., 2013). Six species are currently recognized in this Saharo-Sindian genus: *Lytorhynchus diadema* (Duméril, Bibron and Duméril, 1854), *L. kennedyi* Schmidt, 1939, *L. gasperetti* Leviton, 1977, *L. ridgewayi* Boulenger, 1887, *L. maynardi* Alcock and Finn, 1897 and *L. paradoxus* (Günther, 1875) (Leviton and Anderson, 1970). The phylogenetic relationships within *Lytorhynchus* based on DNA sequences are not known, however *L. diadema* is apparently closely related to *Macroprotodon* and the Old World whip snakes (Pyron et al., 2011).

*Lytorhynchus diadema* is the most widely distributed species of the genus with a range from the Atlantic coast in western and northwestern Africa to the southwestern Iranian provinces Khuzestan and Bushehr. This species occurs through Morocco, Algeria, Mauritania, Tunisia, Libya, northeastern Sudan, Egypt, Israel, Jordan, eastern Syria, the Arabian Peninsula (with fragmented distribution in Saudi Arabia, Yemen, Oman, U.A.E), Kuwait and Iraq (see Latifi, 1991; Bons and Geniez, 1996; Disi et al., 2001; Geniez et al., 2004; Baha el Din, 2006; Egan, 2007; Šmíd, 2010; Bar and Haimovitch, 2011; Gardner, 2013; Sindaco et al., 2013). Isolated populations are known from southern Algeria, Mauritania, Niger and Sudan (Trape and Mané, 2006; Sindaco et al., 2013). There it inhabits sand dunes and

sand banks of inland deserts, often near rocky outcrops. It can also be found in coastal dunes as well as on high grassy plateaus up to about 2000 m a.s.l. (Bons and Geniez, 1996; Schleich et al., 1996). Currently, it is a monotypic species with an unclear subspecific taxonomy (Sindaco et al., 2013) and lacks a taxonomic assessment from both molecular and morphological characters.

Morocco and Western Sahara forms the northwestern borders of the total distribution range of *L. diadema*. Known distribution points in Morocco are scattered randomly and divided into three areas and two environmental-climatic zones (cf. Bons and Geniez, 1996; Geniez et al., 2004; Fig. 1D): a southern area near the border with Western Sahara (Tarfaya region), a middle area between the Anti-Atlas and High Atlas Mountains near the Oued Ziz Valley (both desert climate), and a northern area with a single isolated record of Leviton and Anderson (1970) from the arid zone of Oglat Sedra (Jarada Province). This observation was recorded more than 250 km to the northeast (Bons and Geniez, 1996) from the previously known distribution of this species in Morocco.

During a fieldtrip in Morocco on 21 March 2008, a subadult specimen of *L. diadema* (Fig. 1A) was recorded on the outskirts of Bouarfa (32.52786° N, 1.99646° W, ca. 1115 m a.s.l., Fig. 1B). The habitat was a hamada: high, largely barren, hard, rocky plateaus, with very little sand and few plants. Four syntopic species of reptiles were observed: *Stenodactylus mauritanicus*, *Tropicolotes algericus*, *Trapelus boehmei* and *Mesalina rubropunctata*. On the same day, another adult specimen of *L. diadema* was recorded between Ain ech Chair and Bouanane (32.19638° N, 2.63082° W, 940 m a.s.l., Fig. 1C), in a similar type of habitat. Both animals were found under rocks.

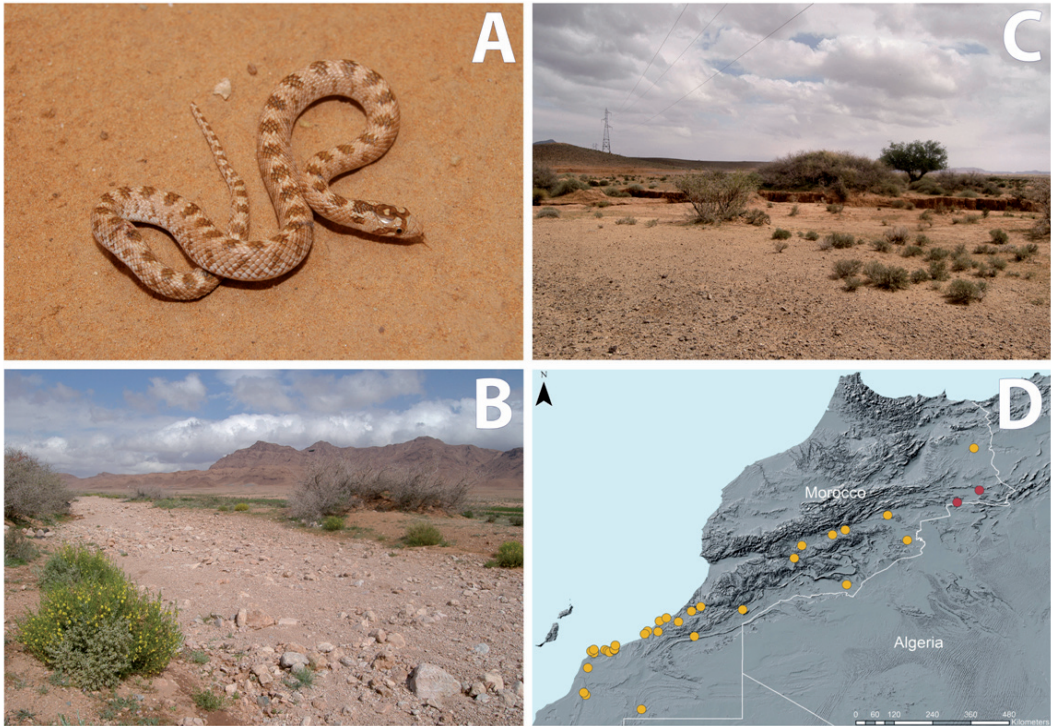
Despite Morocco being one of the best herpetologically best explored areas of North Africa (Bons and Geniez, 1996; Harris et al., 2008, 2010; Barata et al., 2011; Beukema et al., 2013) there are still some regions that have been poorly surveyed, particularly in the

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**Figure 1.** A - Specimen of *Lytorhynchus diadema* found near Bouarfá. B - Habitat of the specimen near Bouarfá. C - Habitat of the specimen found between Ain ech Chair and Bouanane. D - Current distribution of *L. diadema* in Morocco: yellow circles present known records (Bons and Geniez, 1996), red are new records.

region between Tendirra, Beni Tajjite and Figuig in the northeastern part of the country (Bons and Geniez, 1996). According to de Pous *et al.* (2011), this area is predicted to have moderate to high species richness (between 24 to 45 species) and the low numbers of new reptile sightings from this region are likely the result of its inaccessibility. Recently, several new records of the Moroccan herpetofauna (e.g. *Daboia mauritanica*, *Rhagerhis moilensis*, *Spalerosophis dolichospilus*, *Telescopus tripolitanus* or *Trogonophis wiegmanni*) have been reported from this region (Barata *et al.*, 2011; Martínez and León, 2013).

Our records from northeastern Morocco improve our understanding of local herpetological diversity in this region. They show that *L. diadema* has a potentially wider distribution than previously believed. Presumably also the isolated records from Mauritania, Algeria, Niger or Sudan represent marginal populations of this species, which is likely to be distributed continuously in the Saharan-Sahelian areas of northeastern Africa (cf. Trape

and Mané, 2006; Sindaco *et al.*, 2013). In any case, further investigation into the distribution, taxonomy and historical biogeography of *L. diadema* are needed.

**Acknowledgments.** We would like to thank all participants of the “Morocco trip 2008” for their help with field work, especially to P. Kodym (Prague, Czech Republic). We would also like to thank Philip de Pous (Universitat de Lleida, Spain) for helping with the map and reviewing an earlier version of this manuscript and Daniel Noble (Macquarie University, Australia) for English editing.

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