

New cases of syntopy between viperid snakes (*Viperidae*) in the Atlantic Sahara

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Résumé. Les cinq espèces de vipères qui habitent le nord-ouest du Sahara présentent des distributions, des origines et des écologies différentes. Un seul cas de syntopie a été décrit à ce jour entre une espèce d'origine saharienne et une autre d'origine méditerranéenne (*Cerastes cerastes* et *Daboia mauritanica*), facilité par une construction artificielle. Nous présentons ici deux nouveaux cas de syntopie entre deux espèces sahariennes, *C. cerastes* et *Cerastes vipera*, l'un repéré dans des circonstances similaires au cas décrit précédemment : animaux piégés dans la chambre de décantation d'un réservoir d'eau ('matfiya'), l'autre concernant des animaux écrasés sur un même tronçon de route.

Resumen. En el noroeste del desierto del Sahara habitan cinco especies de viperidos, con diferentes distribuciones, orígenes y ecología. Hasta la fecha, sólo se ha descrito un caso de sintopía, facilitada por una construcción artificial, entre una especie sahariana y otra mediterránea (*Cerastes cerastes* y *Daboia mauritanica*). Se presenta un nuevo caso, entre dos especies saharianas, *C. cerastes* y *Cerastes vipera*, en iguales circunstancias al caso ya descrito: atrapadas en la cámara de decantación de un aljibe ('matfiya'), y un nuevo caso, con ambas especies también, de atropello múltiple.

Abstract. Five species of viperid snakes inhabit the northwest of the Sahara desert, with different distributions, origins and ecology. To date, just one case of syntopy has been described between a Saharan and a Mediterranean species (*Cerastes cerastes* and *Daboia mauritanica*), which was eased by a man-made structure. Two other cases are presented, this time between two Saharan species, *C. cerastes* and *Cerastes vipera*. First, sharing the same circumstances as in the case already described: trapped in the sedimentation chamber in a water cistern ('matfiya'); secondly, both species were found in a four-kilometer stretch on a road, where they had been run over.

Key words: North Africa, syntopy, *Viperidae*, water cisterns, road kills.

In the northwestern border of the Sahara Desert, five species of vipers can be found, belonging to four genera with different origins: Saharan (*Cerastes cerastes*, *Cerastes vipera*), Sahelian (*Echis pyramidum leucogaster*), tropical (*Bitis arietans*) and Mediterranean (*Daboia mauritanica*) (Bons & Geniez, 1997; Brito *et al.* 2011). Although some spatial segregation among the palearctic species of vipers usually occurs (Sindaco *et al.* 2013), Brito *et al.* (2011) predict an area of sympatry between the southern slopes of the Anti-Atlas and the Saharan Saquiat Al Hamra. Such sympatry and syntopy have recently been described for two of these species: *C. cerastes* and *D. mauritanica* (Martínez-Freiría *et al.* 2016). Although both taxa have different origins, they cohabit in the Mediterranean-Saharan transition zone that constitutes the southern foothills of the Anti-Atlas in the Lower Draa valley.

In 2017, two sampling campaigns were carried out with the objective of identifying new distribution patterns and spatial overlap for these species of vipers.

A new case of syntopy has been found in two different circumstances within the area of potential sympatry described by Brito *et al.* (2011), and in the same conditions of indirect human influence in one of them. The species involved in both circumstances are the two congeneric species of Saharan origin present in the area: the Sahara horned viper (*C. cerastes*) and the Avicenna viper (*C. vipera*).

Case 1: On 11th April, 2017, in a stretch of four kilometers north of the Oued Saquiat Al Hamra on the R101 road (Tan Tan – Smara; c. 27°N, 11°45'W), we found four individuals of *C. vipera* (an adult male, an adult female and two subadults) together with a subadult specimen of *C. cerastes*. The five vipers had been recently run over. The whole course is characterized by the presence of sandy substrate and absence or scarcity of rocks. One adult of *Chalcides spheopsiformis*, one juvenile of *Rhagheris moilensis*, one subadult of *Spalerosophis diadema cliffordi*, one adult of *Stenodactylus petrii* and one adult and one juvenile of *Trapelus boehmei* were also found having been run over.

Case 2: On 21th May, 2017, at Khang Tuinfid (c. 27°12'N, 11°47'W) on the same R101 road, we found an adult female of *C. cerastes* and an adult specimen of *C. vipera*, similarly to the case described by Martínez-Freiría *et al.* (2016): both animals had fallen into the sedimentation chamber of a water cistern or 'matfiya' (the term in the local language), both of them being found alive (Photo 1).

These two cases confirm the hypothesis of Brito *et al.* (2011), although these two species are most likely to be found together because of their origin, distribution and ecological requirements: such requirements are very similar for both vipers, though somewhat more restrictive in *C. vipera* which is an almost strictly psammophilic species, whereas *C. cerastes* occupies a wide spectrum of desert habitats.

The circumstances described here exemplify two of the leading causes of man-made death among reptiles in these arid environments: being run over on roads and tracks (García-Cardenete 2015) and falling into water cisterns or other man-made structures that act as traps (García-Cardenete *et al.* 2014). However, this last impact is much smaller for *C. vipera* (only 2 specimens registered in more than 4700 inspections made in water cisterns over six years) than for *C. cerastes* (42 specimens) (own data, unpublished).

Bibliographie

Bons, J. & Geniez, P. 1996. *Amphibiens et reptiles du Maroc (Sahara Occidental compris). Atlas biogéographique*. Asociación Herpetológica Española. Barcelona.

Brito, J.C. ; Fahd, S. ; Geniez, P. ; Martínez-Freiría, F. ; Pleguezuelos, J.M. & Trape, J.F. 2011. Biogeography and conservation of viperids from North-West Africa: an application of ecological niche-based models and GIS. *Journal of Arid Environments* 75: 1029-1037.

García-Cardenete, L. 2015. *Capítulo 7. Anfibios y reptiles de los medios saharianos*. Pp.161-179. In: Harmusch. *Expediciones zoológicas al Sahara Atlántico*. Ediciones Rodeno, Cullera.

García-Cardenete, L. ; Pleguezuelos, J.M. ; Brito, J.C. ; Jiménez-Cazalla, F. ; Pérez-García, M.T. & Santos, X. 2014. Water cisterns as death traps for amphibians and reptiles in arid environments. *Environmental Conservation* 41 (4): 341-349.

Martínez-Freiría, F. ; Flores Stols, M.V. & García-Cardenete, L. 2016. Human-mediated syntopy between *Cerastes cerastes* and *Daboia mauritanica* in the lower Drâa Valley, Morocco. *Boletín de la Asociación Herpetológica Española* 27 (2): 27-30.

Sindaco, R. ; Venchi, A. & Grieco, C. 2013. *The Reptiles of the Western Palearctic. Vol. 2: Annotated checklist and distributional atlas of the snakes of Europe, North Africa, Middle East and Central Asia*. Edizioni Belvedere, Latina.

Syntopy between vipers



Photos 1. *Cerastes cerastes*, 21 May 2017, Khang Tuinfid