

Rhagerhis moilensis (REUSS, 1834),
as prey of *Psammophis schokari*
(FORSKÅL, 1775)

Psammophiinae are widely distributed SW Palearctic ophidians, and due to their diurnal activity, commonly observed during surveys (BONS & GENIEZ 1996). Nevertheless, most species are little known in terms of ecology and behavior in the wild. Whereas, *Psammophis schokari* (FORSKÅL, 1775) is one of the most common snake species encountered in the Maghreb and in the Sahara, its ophiophagous behavior is not documented (COTTONE & BAUER 2009). *Rhagerhis moilensis* (REUSS, 1834) is also a common snake in the western Old World desert ecosystems, a typical species that marks the limits between Saharan and Sahelian habitats (TRAPE & MANÉ 2006). Its exact distribution in the margins of the Sahara remains poorly known and maps are not accurate or up-to-date (BONS & GENIEZ 1996) due to difficult access to some areas. This is the first description of predation of *P. schokari* upon *R. moilensis*.



Fig. 1: General view (above) and detail (left) of the ophiophagous behavior observed when *Psammophis schokari* (FORSKAL, 1775), devoured a young *Rhagerhis moilensis* (REUSS, 1834), on a succulent scrub in a Saharan ecosystem near the city of Figuig (eastern Morocco). Photo: David Oudjani.

Forskål's Sand Snake *Psammophis schokari*, is a snake (total length up to 1,400 mm, GENIEZ et al. 2004) with a large distribution range stretching from North Africa to the Middle East, as far as India (SINDACO et al. 2013). In Africa it is found in both Mediterranean and Saharan areas (LEVITON et al. 1992; SCHLEICH et al. 1996; TRAPE & MANÉ, 2006). In Morocco, it occurs mainly in the arid and semi-arid zones, being absent only from the Tangier Peninsula and northern Atlantic coast (BONS & GENIEZ 1996; FAHD & PLEGUEZUELOS 2001; GENIEZ et al. 2004). This snake is an opportunistic feeder but preys mainly upon lizards (FLOWER 1933; BONS 1967; GRUBER 1989; SCHLEICH et al. 1996; COTTONE & BAUER 2009). Two stud-

ies on the diet of Moroccan individuals showed some preference for Gekkonidae and Lacertidae (BONS 1967; FAHD 2001). However, cases of predation upon small rodents and birds have been reported in other countries (see GRUBER 1993; SCHLEICH et al. 1996; COTTONE & BAUER 2009), and there is an observation from Morocco upon predation on a passerine bird in April 2012 (C. and P. BARRAUD, pers. comm.). Ophiophagy in this species, however, lacks concrete documented observations.

The Moila Snake, *Rhagerhis moilensis* is a diurnal snake (total length up to 1,300 mm, GENIEZ et al. 2004) occurring in Saharan habitats from the Atlantic coast (Morocco, Mauritania) to the Middle East



Fig. 2: General view of the xeric habitat near the city of Figuig (eastern Morocco) where the predation event took place. Photo: David Oudjani.

deserts of Iran (BÖHME & DE PURY 2011). In Morocco, it is reportedly absent from the Mediterranean and Sahelian habitats (GENIEZ et al. 2004) and the large erg formations (TRAPE & MANÉ 2006). According to the repartition mapped in BONS & GENIEZ (1996) there are no records along the northern margin of the Sahara in the area between Boudenib and Figuig in southeastern Morocco. However, recently some individuals were found between Belibilia and Mengoub (BARATA et al. 2011). The distribution map in SINDACO et al. (2013) correctly includes the Figuig area in the easternmost part of Morocco where *R. moilensis* was reported in August 2013 near the road north of Figuig (G. Martinez del Marmol Marin, pers. comm.).

On August 17, 2010, the authors observed an unsexed adult specimen of *P. schokari* ingesting a young *R. moilensis* in a small scrub (Fig. 1). The day was sunny, very dry and hot, typical of local end of summer (38 °C). The location (32.2725° N/ 1.467778° W, WGS84 datum) was a dry sandy plain of the Saharan northern margins of east Morocco near the city of Figuig. Vegetation was scarce, with spiny and succulent plants, typical of xeric habitats (Fig. 2). The predation sequence was observed only after *P. schokari* had started to swallow the head and first centimeters of the body of the Moila Snake. The observed event lasted

14 minutes (14:24 - 14:38 h local time). *Psammophis schokari* is regularly seen and usually tries to escape quickly from human presence, but in this particular case, did not flee or regurgitate the prey. Once the prey was totally swallowed, the snake escaped quickly. Completion of the predatory action was apparently given priority by the snake over the potential threat coming from the human observers.

Even if *P. schokari* is known to be mainly saurophagous, it is not surprising to observe an instance of ophiophagy. Both snakes are diurnal and can be syntopic. The fact that *R. moilensis* was a young snake may explain the success of the attack. It is highly unlikely that *P. schokari* exhibited a scavenger behavior in that case. In this area, animal corpses are infested by ants in the first ten minutes after death, and that was not the case on the fresh body observed in the predator's mouth. *Psammophis schokari* remains one of the species whose dietary habits are poorly known. Particular attention should be paid to learn more about its ecology in general and trophic regime in particular.

ACKNOWLEDGEMENTS: The authors thank A. Retnani (Casablanca) for financial support of the expedition that lead to this observation and M. Ribí (Chef de la Division des Parcs et Réserves Naturelles, Maroc) and Mr. A. El Hafí (Haut-Commissaire aux Eaux et Forêts et à la Lutte Contre la Désertification, Maroc) for prospection permits. Further thanks go to Ph. Geniez (E.P.H.E., Montpellier), G. Martinez del Marmol Marin (Granada) and A. Cottone (Villanova University, Pennsylvania) for sharing precious information on Psammophiinae snakes diet and repartition. The first author is also thankful to "Association du Refuge des Tortues" through J. Maran (Bessières, France) for continual support in field prospections.

REFERENCES: BARATA, M. & PERERA, A. & HARRIS, D. J. & VAN DER MEIJDEN, A. & CARRANZA, S. & CEACERO, F. & GARCIA-MUNOZ, E. & GONÇALVES, D. & HENRIQUES, S. & JORGE, F. & MARSHALL, J. C. & PEDRAJAS, L. & SOUSA, P. (2011): New observations of amphibians and reptiles in Morocco, with a special emphasis on the eastern region.- Herpetological Bulletin, London; 116: 4-13. BÖHME, W. & DE PURY, S. (2011): A note on the generic allocation of *Coluber moilensis* REUSS, 1834 (Serpentes: Psammophiidae).- Salamandra, Rheinbach; 47 (2): 120-123. BONS, J. (1967): Recherches sur la biogéographie et la biologie des amphibiens et des reptiles du Maroc (PhD dissertation). University of Montpellier, France; pp. 321. BONS, J. & GENIEZ, P. (1996): Amphibiens et Reptiles du Maroc (Sahara Occidental compris): Atlas biogéographique. Anfíbios y reptiles de Marruecos (Incluido Sáhara Occidental): Atlas biogeográfico. Amphibians

& reptiles of Morocco (Including Western Sahara): Biogeographical Atlas. Barcelona (Asociación Herpetológica Española), pp. 320. COTTONE, A. M. (2007): Ecological investigation of the Psammophiidae (Squamata: Serpentes). M.Sc. thesis, Villanova University, Pennsylvania, USA; pp. 163. COTTONE, A. M. & BAUER, A. M. (2009): Sexual size dimorphism, diet, and reproductive biology of the Afro-Asian Sand Snake, *Psammophis schokari* (Psammophiidae).- Amphibia-Reptilia, Leiden; 30: 331-340. FAHD, S. (2001): Biogéographie, morphologie et écologie des ophiidiens du Rif (Nord du Maroc). Ph.D thesis, Tetouan University Abdelmalek Essaâdi, Morocco; pp. 316. FAHD, S. & PLEGUEZUELOS, J. M. (2001): Los reptiles del Rif (Norte de Marruecos). II: anfisbenios y ofidios. Comentarios sobre la biogeografía del grupo.- Revista Española de Herpetología, Salamanca; 15: 13-36. FLOWER, M. S. S. (1933): Notes on the recent reptiles and amphibians of Egypt, with a list of the species recorded from that kingdom.- Proceedings of the Zoological Society of London, London; 103 (3): 735-851. GENIEZ, PH. & MATEO, J. A. & GENIEZ, M. & PETHER, J. (2004): The amphibians and reptiles of the Western Sahara and adjacent regions. An atlas and field guide. Frankfurt am Main, Germany (Chimaira Editions) [Frankfurt contributions to natural history 19], pp. 229. GRUBER, U. (1989): Die Schlangen Europas und rund ums Mittelmeer. Stuttgart (Franckh'sche Verlagshandlung), pp. 248. GRUBER, U. (1993): Guía de las serpientes de Europa, Norte de África y Próximo Oriente. Barcelona (Omega), pp. 247. LEVITON, A. E. & ANDERSON, S. C. & ADLER, K. & MINTON, S. A. (1992): Handbook to Middle East amphibians and reptiles. Ithaca (Society for the Study of Amphibians and Reptiles) [Contributions to herpetology 8]. SCHLEICH, H. H. & KÄSTLE, W. & KABISCH, K. (1996): Amphibians and reptiles of North Africa: Biology, Systematics, Field Guide. Koenigstein (Koeltz Scientific Books), pp. 627. SHINE, R. & BRANCH, W. R. & HARLOW, P. S. & WEBB, J. K. & SHINE, T. (2006): Sexual dimorphism, reproductive biology, and dietary habits of psammophiine snakes (Colubridae) from southern Africa.- Copeia, Washington; 2006: 650-664. SINDACO, R. & VENCHI, A. & GRIECO, C. (2013): The reptiles of the Western Palearctic. 2. Annotated checklist and distributional atlas of the snakes of Europe, North Africa, Middle East and Central Asia, with an update of the vol. 1. Latina (Edizioni Belvedere), pp. 543. TRAPE, J.-F. & MANÉ, Y. (2006): Guide des serpents d'Afrique occidentale - Savane et désert. Marseille (IRD Editions), pp 503.

KEYWORDS: Reptilia: Squamata: Serpentes: Lamprophiidae: Psammophiinae; *Psammophis schokari*, *Rhagerhis moilensis*, predation, ophiophagy, behavior; Morocco, Sahara

SUBMITTED: July 8, 2014

AUTHORS: David OUDJANI (Corresponding author < david oudjani@yahoo.fr >) – 19, rue Jean Crampagne, 31200 Toulouse, France; Michel AYMERICH – Appartement 87, Résidence “La Chênaie”, 805, Avenue du Val de Montferrand, 34090 Montpellier, France < aymerich.michel@yahoo.fr >; Mohamed MEDIANI – Faculté des Sciences, Département de Biologie, Laboratoire de Diversité et Conservation des Systèmes Biologiques. Université Abdelmalek Essaâdi, Tétouan, Morocco.