

# COMMENTED CATALOGUE OF THE HERPETOLOGICAL COLLECTION FROM MOROCCO IN THE MUSEO NACIONAL DE CIENCIAS NATURALES (MADRID, SPAIN), WITH EMPHASIS ON THE MATERIAL COLLECTED DURING HISTORICAL EXPEDITIONS

Alberto Sánchez-Vialas\* & Marta Calvo-Revuelta

Museo Nacional de Ciencias Naturales (MNCN-CSIC), C/ José Gutiérrez Abascal 2, 28006, Madrid, Spain.  
ORCID iD: AS-V: <http://orcid.org/0000-0003-0068-7669> — MC-R: <http://orcid.org/0000-0002-8628-1055>

\*Corresponding author: [albertosv@mncn.csic.es](mailto:albertosv@mncn.csic.es)

## ABSTRACT

A catalogue of the amphibians and reptiles from Morocco held at the Museo Nacional de Ciencias Naturales de Madrid (MNCN-CSIC) is presented. We highlight the valuable contributions of two historical expeditions in Morocco. In both expeditions a total of 31 species were collected, mainly from Essaouira, Tánger, Ketama and surroundings. The presence of the specimens which represented the first records of *Cerastes vipera* and *Scincus albifasciatus* for Morocco is confirmed. Also, the MNCN collection held the type series of *Rana ridibunda riodeoroi*, *Psammotromus algirus ketamensis* and *Salamandra algira tingitana*. Historical collected specimens held in scientific collections could provide valuable information for identify changes in biological communities and planning biodiversity conservation measures.

**Key words:** amphibians; reptiles; Northern Africa; scientific collections; historical expeditions.

## RESUMEN

**Catálogo comentado de la colección herpetológica procedente de Marruecos del Museo Nacional de Ciencias Naturales (Madrid, España), con énfasis en el material colectado durante expediciones históricas**

Se presenta el catálogo de los anfibios y reptiles de Marruecos conservados en el Museo Nacional de Ciencias Naturales de Madrid (MNCN-CSIC) y se destaca la especial relevancia de las contribuciones realizadas por dos expediciones históricas para el conocimiento herpetológico de la región. Ambas expediciones sumaron un total de 31 especies colectadas principalmente en las regiones de Essaouira, Tánger y Ketama. Se constata la presencia en la colección de los ejemplares que representaron las primeras citas de *Cerastes vipera* y *Scincus albifasciatus* en Marruecos. Asimismo, alberga las series tipo de *Rana ridibunda riodeoroi*, *Psammotromus algirus ketamensis* y *Salamandra algira tingitana*. Los especímenes colectados en tiempos históricos conservados en colecciones científicas ofrecen una valiosa información para identificar cambios sufridos por las comunidades biológicas y diseñar medidas de conservación de la biodiversidad.

**Palabras clave:** anfibios; reptiles; Norte de África; colecciones científicas; expediciones históricas.

**Recibido/Received:** 1/02/2018; **Aceptado/Accepted:** 28/05/2018; **Publicado en línea/Published online:** 20/07/2018

**Cómo citar este artículo/Citation:** Sánchez-Vialas, A. & Calvo-Revuelta, M. 2018. Commented catalogue of the herpetological collection from Morocco in the Museo Nacional de Ciencias Naturales (Madrid, Spain), with emphasis on the material collected during historical expeditions. *Graellsia*, 74(2): e071. <https://doi.org/10.3989/graellsia.2018.v74.199>

**Copyright:** © 2018 SAM & CSIC. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International (CC BY 4.0) License.

## Introduction

Morocco comprises a large portion of the amphibian and reptile terrestrial diversity of North Africa: 14 species of amphibians and 101 species of reptiles have been recorded until now (Bons & Geniez, 1996; Beukema *et al.*, 2013; Tamar *et al.*, 2017; <http://www.moroccoherps.com>) and represent the best sampled areas of the Maghreb (Bons & Geniez, 1996; Schleich *et al.*, 1996; Geniez *et al.*, 2004; Fahd & Pleguezuelos, 1996, 2001; Carranza *et al.*, 2002; Escoriza, 2010; Barata *et al.*, 2011; Metallinou *et al.*, 2012; Mediani *et al.*, 2015; Martínez-Freiría *et al.*, 2017). However, between the years 1789 and 1867 most of faunistic works that include the Maghreb region were carried out in Algeria (Boulenger, 1891). It was not until 1874 and 1883, with the publication of “*Reptilien von Marocco und von den canarischen Inseln*” and “*Die Reptilien und Amphibien von Marocco II*” respectively by Boettger, when the Moroccan diversity of herptiles became better known (Boettger, 1883; Boulenger, 1891).

During the first decades of the 20th century, several works and field expeditions contributed greatly to a better understanding of Moroccan reptiles and amphibians diversity (Günther, 1903; Zulueta, 1908, 1909a, 1909b; Boettger, 1921; Galán, 1931; Werner, 1931). One of the first field expedition in Morocco with important herpetological contributions was led by the Spanish entomologist Manuel Martínez de la Escalera, who was commissioned by the “Comisión Permanente para el Estudio del NO de África” mainly during the years 1905 and 1907 (Zulueta, 1909b; Martín & Izquierdo, 2011). Later, Fernando Galán explored the Rif mountains in 1930 during the “Misión Científica Bolívar” (Bueno & Blanco, 2002), which were one of the most unexplored areas of Morocco at that time (Zulueta, 1909a). Most of the materials collected in both historical expeditions are conserved at the Museo Nacional de Ciencias Naturales, in Madrid (MNCN-CSIC).

As showed by Suarez & Tsutsui (2004), museum collections provide with numerous contributions to science and society. Particularly, in areas such as zoology and conservation (eg. monitoring of environmental change), museum collections represent an excellent source of information that provides historical data on the past species distribution and its biological features. These sources can be used to perform a baseline to study the changes and composition of biological communities or local extinctions (Grixti *et al.*, 2009). Within this framework, the exponential growth of field work carried out both by researchers (Brito *et al.*, 2011; Beukema *et al.*, 2013; Sánchez & Escoriza, 2014; Martínez-Freiría *et al.*, 2017; Rosado *et al.*, 2017; Tamar *et al.*, 2017) and by amateur people interested in herpetology and in nature of Morocco (as reflected by the development of web pages such

as <http://www.moroccoherps.com>), provides a remarkable source of current information which, joined to scientific collections, could be useful to infer temporal changes in biological characteristics, to identify possible local extinctions and also to planning biodiversity conservation measures.

Here, we present a catalogue of the specimens of amphibians and reptiles from Morocco which are stored at the herpetological collection of the Museo Nacional de Ciencias Naturales (MNCN-CSIC), giving special emphasis to the material collected during the two historical expeditions cited.

## Material and methods

Localities where specimens were collected are listed in Appendix 1 and are provided with the current nomenclature in Spanish language, as present in the MNCN collection data base. Thus, the former nomenclature of localities present in the labels [e.g. Mogador (=Essaouira)], are here updated (see Martín & Izquierdo, 2011 for references). Geographic coordinates of the localities from Appendix 1, are presented in Appendix 2. The coordinates are obtained using Google Earth tools, and represented approximately by decimal grades. However, some localities could not be found and lack the coordinate's data. The taxonomic nomenclature used for amphibians follows Frost (2018), while for reptiles we have followed Uetz *et al.* (2018).

## Results and discussion

The material of the herpetological collection of the MNCN-CSIC (Appendix 1) conserves a large representation of the diversity of amphibians and reptiles from Morocco: 11 species of amphibians and 49 of reptiles, which constitute 78.6 % of the total diversity for amphibians and 48.5% for reptiles in Morocco. Currently, all specimens are maintained in ethanol 70%; however, most of the old collected specimens were formerly fixed and conserved in formalin. Moreover, the collection includes a well representation of 12 species which are stored as articulated skeletons and 8 species as cleared and stained specimens. Only one specimen, of *Varanus griseus*, is conserved as naturalized.

The MNCN collection also holds the type series of three taxa (Fig. 1): *Rana ridibunda riodeoroi* Salvador & Peris, 1975, *Salamandra algira tingitana* Donaire-Barroso & Bogaerts, 2003, and *Psammotromus algirus ketamensis* Galán, 1931. While the taxonomic status of *Salamandra algira tingitana* is currently valid (Beukema *et al.*, 2013), *Psammotromus algirus ketamensis* Galán, 1931 does not represent a supported subspecies (Carranza *et al.*, 2006). Subspecific status of *Rana ridibunda riodeoroi* is currently valid but it is currently included within the taxon *Pelophylax*



Fig. 1.— Type specimens of *Rana ridibunda riodeoroi* (Holotype) (A), *Psammodromus algirus ketamensis* (Holotype) (B) and *Salamandra algira tingitana* (Paratype) (C).

Fig. 1.— Ejemplares tipo de *Rana ridibunda riodeoroi* (Holotipo) (A), *Psammodromus algirus ketamensis* (Holotipo) (B) and *Salamandra algira tingitana* (Paratipo) (C).

*saharicus*. Recent studies show three different lineages through the geographic range of *P. saharicus*: a western clade widespread along most part of Morocco, a central clade recorded in central-northern Algeria, and the eastern clade identified in Tunisia and Southeastern Algeria (Harris *et al.*, 2003; Nicolas

*et al.*, 2015). The type locality of the species is Golea, Laghout and Salah Oasis, Algeria, but populations from this locality have not been genetically analyzed and their relationships with the described clades remain unknown. This could suggest the possibility of future taxonomical changes if these clades are

considered to represent different species and if populations from the type locality accommodate in a different clade from the Moroccan populations. In that case, the Moroccan clade must adopt the combination *Pelophylax riodeoroi*, but more phylogeographic and integrative studies are needed to solve this question (Martínez-Solano *et al.*, 2015).

Most of the material come from historical times corresponding to different expeditions. The major contribution regarding species richness is represented by the expeditions made by M. M. de la Escalera during “Comisión Permanente para el Estudio del NO de África” between 1905 and 1907, followed by the expedition of “Misión Científica Bolívar” in 1930 (Fig. 2). Other notable contribution, especially concerning the number of specimens comes from recent field work in the Moroccan Atlantic coast carried out by researchers of the MNCN in the 80s. Most of the material collected were anuran tadpoles, which form the most numerous contribution regarding specimens number (Fig. 3).

Several expeditions from the “Comisión Permanente para el Estudio del Noroeste de África” compiled a great deal of information about the diversity and distribution of Moroccan amphibians and reptiles. The MNCN collection holds the following specimens collected during these expeditions: *Bufotes boulengeri* (MNCN 2958-2959, MNCN 2968-2969), *Sclerophrys mauritanica* (MNCN 2997, MNCN 2998, MNCN 2999, MNCN 3000, MNCN 3008-3011, MNCN 3012-3016, MNCN 3017-3022), *Pelophylax saharicus* (MNCN 1324-1330, MNCN 1331-1335, MNCN 1336-1356, MNCN 3562, MNCN 3583), *Macroprotodon brevis* (MNCN 1742-1785, MNCN 1786-1792, MNCN 8424-8426), *Hemorrhoids hippocrepis* (MNCN 8973, MNCN 16552, MNCN 18001, MNCN 18003-18005), *Natrix*

*maura* (MNCN 8570-8571), *Malpolon monspesulanus* (MNCN 8870, MNCN 8881, MNCN 8890-8895, MNCN 8896-8897, MNCN 8898-8899, MNCN 8910, MNCN 8934-8939, MNCN 9043, MNCN 9044, MNCN 9045, MNCN 9046, MNCN 9047, MNCN 9048), *Psammophis schokari* (MNCN 46203, MNCN 46204, MNCN 23181-23182, MNCN 23183), *Vipera latastei* (MNCN 20254), *Cerastes vipera* (MNCN 22992), *Daboia mauritanica* (MNCN 20256-20257), *Naja haje* (MNCN 22707), *Acanthodactylus aureus* (MNCN 5635-5651), *Acanthodactylus erythrurus* (MNCN 7580, MNCN 7667-7668, MNCN 7670-7749, MNCN 18025-18027, MNCN 7666), *Psammodromus algirus* (MNCN 7822-7824, MNCN 7847), *Psammodromus microdactylus* (MNCN 7879-7881), *Blanus tingitanus* (MNCN 8151), *Trogonophis wiegmanni* (MNCN 8228, MNCN 8247-8275), *Agama impalearis* (MNCN 4735-4736, MNCN 4738-4741, MNCN 4778-4779, MNCN 4781-4782, MNCN 4787, MNCN 4801, MNCN 4805-4807, MNCN 4808, MNCN 5020-5033), *Chalcides pseudostratus* (MNCN 5231), *Chalcides ocellatus* (MNCN 5356), *Chalcides polylepis* (MNCN 5353-5354, MNCN 5357-5359, MNCN 5380), *Chalcides colosii* (MNCN 5373), *Chalcides mionecton* (MNCN 5407, MNCN 5411-5499), *Eumeces algeriensis* (MNCN 5747-5774, MNCN 5717-5737, MNCN 5739-5740), *Scincus albifasciatus* (MNCN 5702), *Testudo graeca* (MNCN 4134-4135).

The expedition of “Misión Científica Bolívar”, carried out throughout northern Morocco, resulted in the follow specimens deposited in the MNCN collection: *Salamandra algira* (MNCN 904-907), *Discoglossus scovazzi* (MNCN 734-740, MNCN 741, MNCN 742, MNCN 744, MNCN 745-749), *Bufo spinosus* (MNCN 645), *Sclerophrys mauritanica* (MNCN 2970-2971; MNCN 2972-2973; MNCN 2991; MNCN 2992-2994),

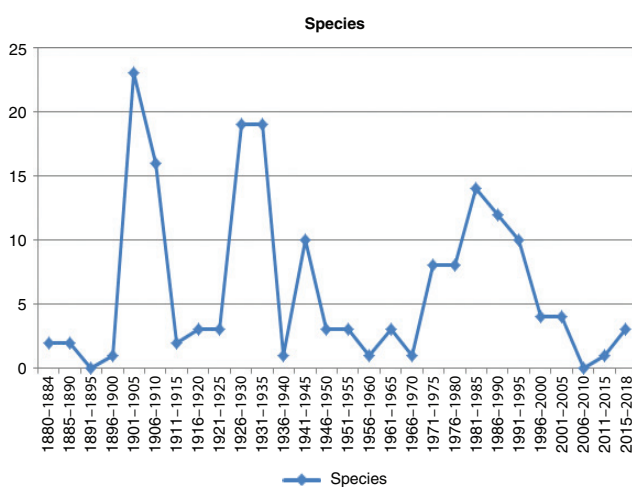


Fig. 2.— Representation of the growth rate regarding the species' number and their date of deposit in the MNCN herpetological collection.

Fig. 2.— Relación entre el número de especies y su período de ingreso en la colección de herpetología del MNCN.

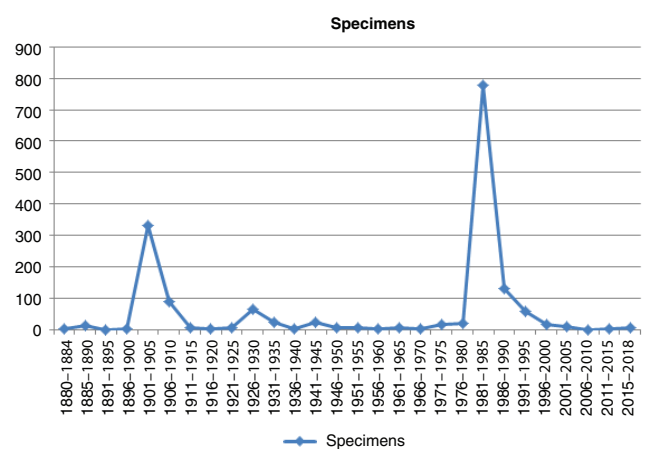


Fig. 3.— Representation of the growth rate regarding the specimen's number and their date of deposit in the MNCN herpetological collection

Fig. 3.— Relación entre el número de ejemplares y su período de ingreso en la colección de herpetología del MNCN.





Fig. 4.— First known specimens from Morocco of the species *Scincus albifasciatus* (A) and *Cerastes vipera* (B), both collected from Cabo Juby, Tarfaya, during Comisión Permanente para el Estudio del Norte de África.

Fig. 4.— Primeros ejemplares registrados en Marruecos de las especies *Scincus albifasciatus* (A) and *Cerastes vipera* (B), ambas colectadas de Cabo Juby, Tarfaya, durante la Comisión Permanente para el Estudio del Norte de África.

*Pelophylax saharicus* (MNCN 1322, MNCN 1323, MNCN 1364, MNCN 1365-1369, MNCN 1370), *Macroprotodon brevis* (MNCN 8421, MNCN 23296, MNCN 16621), *Coronella girondica* (MNCN 18450, MNCN 18453-18454, MNCN 18452, MNCN 46205,

MNCN 18451), *Natrix astreptophora* (MNCN 8654), *Natrix maura* (MNCN 8706), *Acanthodactylus erythrurus* (MNCN 7584, MNCN 7586, MNCN 7763-7764, MNCN 21388), *Psammodromus algirus* (MNCN 7779-7780, MNCN 7797, MNCN 7846,

MNCN 7848-7852, MNCN 7853), *Timon tangitanus* (MNCN 6056, MNCN 6058), *Blanus tingitanus* (MNCN 8167), *Agama impalearis* (MNCN 4802-4804), *Chalcides pseudostratus* (MNCN 5381), *Chalcides colosii* (MNCN 5396).

General contributions of the expedition “Comisión Permanente para el Estudio del NO de África” came from the surroundings of Essaouira (formerly Mogador) (17 species from a total of 25 collected species). During the expedition “Misión Científica Bolívar” were collected 16 species from the Rif Mountains, especially from Ketama surroundings.

Most of the specimens were collected in western Morocco, from Tánger in the Tingitana Peninsula to the southern region of the former Spanish Sahara (Río de Oro), currently the Western Sahara. The collection lacks data from localities placed in the oriental region of Morocco, with no Spanish influence. Therefore, several specimens collected in both historical expeditions are related with the regions in which Spain had protectorates and colonies [Rif region, Ifni, Southern Morocco (Cabo Juby) and Western Sahara (Saguia el Hamra and Río de Oro)].

One of the most remarkable herpetological contribution from “Comisión Permanente para el Estudio del NO de África” that are preserved at the MNCN were the specimens that represent the first record to Morocco of the species *Cerastes vipera* (MNCN 22992) and *Scincus albifasciatus* (MNCN 5702), both collected in Tarfaya in 22 November 1906 (Fig. 4), confirming in that time the presence of these Saharan species in Western Maghreb (Zulueta, 1909b). Historical data of the expedition made by M. M. Escalera could serve as a reference point to compare it with the current information. While the presence of *Cerastes vipera* has been reported several times in recent years during several field trips (<http://www.moroccoherps.com>, Alberto Sánchez-Vialas obs. pers), no individual of *Scincus scincus* in the area has been observed since the record of 1906 (Zulueta, 1909b). The lack of current observation of *S. scincus* in Tarfaya region suggests that more field work, especially in Cape Juby, is needed to confirm its presence or its possible local extinction. This last hypothesis seems to be less likely due to 1) the apparently well conserved areas across the region of Tarfaya (including a protected area: Khenifiss National Park), 2) no declining or local extinction of other groups of Squamata have been reported, and 3) the secretive behavior of this species. However, it can be spotted by the identification of its tracks in the sand, making it an easy target to report.

During the review of the collection, two doubtful records were revealed. Those need to be confirmed due to the considerable range extension of the species' distribution and also by the prevalence of drastically different ecological conditions at these localities. These are *Chalcides mionecton* (MNCN 5409) from “Uad Alia”, Western Sahara (collected on 8/1963) and

*Eumeces algeriensis* (MNCN 5652) from “Iguidsen”, Western Sahara (collected on 19/09/1967). Both species are Mediterranean taxa and its presence in the Western Sahara seems to be unlikely.

Following the revision of the collected material, we were able to identify several specimens without determination or misidentified, mostly corresponding to scincids of the genus *Chalcides*, such as *C. pseudostratus*, *C. delislei* and *C. colosii*. Although several species of scincids were expected to undergo taxonomic changes (Carranza *et al.*, 2008), this group of Squamata has received little attention within a phylogeographic perspective in comparison with other groups such as Lacertidae, Amphisbaenidae or Gekkota in North Africa. That tendency could be caused by their secretive habits and activity, difficulty of collection and, occasionally, difficulty for reaching certain regions or habitat destruction that could have caused local extinctions. Under this framework, collection specimens could be an essential source to study certain groups as scincids or rare species as *Chalcides ebneri*. From this latter taxon, endemic to central Morocco (only known from three localities based in four specimens), no specimens were found during our revision, and at present the only known specimen preserved of this species, the holotype, is held in the Museum of Comparative Zoology at Harvard University. This is another example of how the knowledge of biological diversity remains linked with scientific collections, which can help to improve the conservation status and provide an important source of past and present information.

## Acknowledgments

We extend our gratitude to Arlo Hinckley, Juan M. Pleguezuelos and Ignacio De la Riva for his valuable comments which helped to improve the manuscript.

## References

- Barata, M., Perera, A., Harris, D. J., Meijden, A. van der, Carranza, S., Ceacero, F., García-Muñoz, 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*, 116: 4–13.
- Beukema, W., Pous, P. de, Donaire-Barroso, D., Bogaerts, S., García-Porta, J., Escoriza, D., Arribas, O. J., El Mouden, E. H. & Carranza, S., 2013. Review of the systematics, distribution, biogeography and natural history of Moroccan amphibians. *Zootaxa*, 3661: 1–60. <https://doi.org/10.11646/zootaxa.3661.1.1>
- Boettger, C. R., 1921. Meine Exkursion zur spanischen Kolonie Rio de Oro in Westafrika. *Berichte der Senckenbergischen Naturforschenden Gesellschaft*, 51: 72–84.
- Boettger, O., 1883. Die Reptilien und Amphibien von Marocco II. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft*, 13: 93–146.



- Bons, J. & Geniez, P. H., 1996. *Anfibios y Reptiles de Marruecos (Incluido Sahara Occidental)*. Atlas biogeográfico. Asociación Herpetológica Española. Barcelona. 320 pp.
- Boulenger, G. A., 1891. V. Catalogue of the Reptiles and Batrachians of Barbary (Morocco, Aleria, Tunisia), based chiefly upon the Notes and Collections made in 1880–1884 by M. Fernand Lataste. *The Transactions of the Zoological Society of London*, 13(3): 93–164. <https://doi.org/10.1111/j.1096-3642.1891.tb00047.x>
- 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(11): 1029–1037. <https://doi.org/10.1016/j.jaridenv.2011.06.006>
- Bueno, A. G. & Blanco, A. G., 2002. *Los naturalistas españoles en el África hispana (1860–1936)*. Organismo Autónomo Parques Nacionales. Madrid.
- Carranza, S., Arnold, E. N., Geniez, P., Roca, J. & Mateo, J. A. 2008. Radiation, multiple dispersal and parallelism in the skinks, *Chalcides* and *Sphenops* (Squamata: Scincidae), with comments on *Scincus* and *Scincopus* and the age of the Sahara Desert. *Molecular phylogenetics and evolution*, 46(3): 1071–1094. <https://doi.org/10.1016/j.ympev.2007.11.018>
- Carranza, S., Arnold, E. N., Mateo, J. A. & Geniez, P., 2002. Relationships and evolution of the North African geckos, *Gekkonina* and *Tarentola* (Reptilia: Gekkonidae), based on mitochondrial and nuclear DNA sequences. *Molecular phylogenetics and evolution*, 23(2): 244–256. [https://doi.org/10.1016/S1055-7903\(02\)00024-6](https://doi.org/10.1016/S1055-7903(02)00024-6)
- Carranza, S., Harris, D. J., Arnold, E. N., Batista, V. & Gonzalez de la Vega, J. P., 2006. Phylogeography of the lacertid lizard, *Psammotromus algirus*, in Iberia and across the Strait of Gibraltar. *Journal of Biogeography*, 33(7): 1279–1288. <https://doi.org/10.1111/j.1365-2699.2006.01491.x>
- Escoriza, D., 2010. Ecological niche modeling of two Afrotropical snakes: is the Sahara desert a true barrier for these species? *Revista Española de Herpetología*, 24: 93–100.
- Fahd, S. & Pleguezuelos, J. M., 1996. Los Reptiles del Rif (norte de Marruecos), I: Quelonios, Saurios. *Revista Española de Herpetología*, 10: 55–89.
- 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*, 15: 13–36.
- Frost, D. L., 2018. *Amphibian Species of the World: an Online Reference. Version 6.0 (20/05/2018)*. American Museum of Natural History. New York. Electronic Database accessible at <http://research.amnh.org/herpetology/amphibia/index.html>
- Galán, F., 1931. Batracios y reptiles del Marruecos español. *Boletín de la Real Sociedad Española de Historia Natural*, 31(5): 361–67.
- Geniez, P., Mateo, J. A., Geniez, M. & Pether, J., 2004. *The Amphibians and Reptiles of Sahara Occidental. An atlas and field guide*. Chimaira. Frankfurt am Main. 229 pp.
- Grixti, J. C., Wong, L. T., Cameron, S. A. & Favret, C., 2009. Decline of bumble bees (*Bombus*) in the North American Midwest. *Biological conservation*, 142(1): 75–84. <https://doi.org/10.1016/j.biocon.2008.09.027>
- Günther, A., 1903. Reptiles from Rio de Oro, Sahara Occidental. *Novitates Zoologicae*, 10: 298–299.
- Harris, D. J., Batista, V. & Carretero, M. A., 2003. Diversity of 12S mitochondrial DNA sequences in Iberian and northwest African water frogs across predicted geographic barriers. *Herpetozoa* 16: 81–83.
- Martin, A. C. & Izquierdo M. I. (eds.). 2011. *Al encuentro del naturalista Manuel Martínez de la Escalera (1867–1949)*. Monografía nº 25. Museo Nacional de Ciencias Naturales, CSIC. 694 pp + DVD.
- Martínez-Freiría, F., Crochet, P. A., Fahd, S., Geniez, P., Brito, J. C. & Velo-Antón, G. 2017. Integrative phylogeographical and ecological analysis reveals multiple Pleistocene refugia for Mediterranean *Daboia* vipers in north-west Africa. *Biological Journal of the Linnean Society*, 122(2): 366–384. <https://doi.org/10.1093/biolinnean/blx038>
- Martínez-Solano, I., Buckley D. & Velo-Antón, G., 2015. *Filogeografía comparada de los géneros Pelophylax y Discoglossus en el norte de África*. Instituto de Estudios Ceutíes. Ceuta. 80 pp.
- Mediani, M., Brito, J. C. & Fahd, S., 2015. Atlas of the amphibians and reptiles of northern Morocco: updated distribution and patterns of habitat selection. *Basic and Applied Herpetology*, 29: 81–107. <https://doi.org/10.11160/bah.14009>
- Metallinou, M., Arnold, E.N., Crochet, P.A., Geniez, P., Brito, J.C., Lymberakis, P., Baha El Din, S., Sindaco, R., Robinson, M. & Carranza, S., 2012. Conquering the Sahara and Arabian deserts: systematics and biogeography of *Stenodactylus* geckos (Reptilia: Gekkonidae). *BMC Evolutionary Biology*, 12(1): 258. <https://doi.org/10.1186/1471-2148-12-258>
- Nicolas, V., Mataame, A., Crochet, P. A., Geniez, P. & Ohler, A., 2015. Phylogeographic patterns in north African water frog *Pelophylax saharicus* (Anura: Ranidae). *Journal of Zoological Systematics and Evolutionary Research*, 53(3): 239–248.
- Rosado, D., Rato, C., Salvi, D. & Harris, D. J., 2017. Evolutionary history of the Morocco lizard-fingered geckos of the *Saurodactylus brossei* complex. *Evolutionary Biology*, 44(3): 386–400. <https://doi.org/10.1007/s11692-017-9417-8>
- Sánchez, A. & Escoriza, D., 2014. Checkerboard worm lizard (*Trogonophis wiegmanni*) new records and description of its ecological niche in North-Western Africa. *Bulletin de la Société Herpétologique de France*, 152: 29–36.
- Schleich, H. H., Werner, K. & Klaus K., 1996. *Amphibians and reptiles of North Africa*. Koeltz Scientific Books. Königstein. 627 pp.
- Suarez, A. V. & Tsutsui, N. D., 2004. The value of museum collections for research and society. *BioScience*, 54(1): 66–74. [https://doi.org/10.1641/0006-3568\(2004\)054%5B0066:TVOMCF%5D2.0.CO;2](https://doi.org/10.1641/0006-3568(2004)054%5B0066:TVOMCF%5D2.0.CO;2)
- Tamar, K., Geniez, P., Brito, J. C. & Crochet, P. A., 2017. Systematic revision of *Acanthodactylus busacki* (Squamata: Lacertidae) with a description of a new species from Morocco. *Zootaxa*, 4276(3): 357–386. <https://doi.org/10.11646/zootaxa.4276.3.3>

- Werner, F., 1931. Ergebnisse einer zoologischen Forschungsreise nach Marokko. III Amphibien und Reptilien. *Sitzungsberichte der Koenigliche Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe*, 140: 271–318.
- Zulueta, A., 1908. Nota sobre batracios y reptiles de Mogador, con descripción de la forma joven de “*Saurodactylus mauritanicus*” (Dum. et Bibr.). *Boletín de la Real Sociedad Española de Historia Natural*, 8: 450–456.
- Zulueta, A., 1909a. Nota sobre reptiles de Melilla. *Boletín de la Real Sociedad Española de Historia Natural*, 10: 351–354.
- Zulueta, A., 1909b. Nota sobre reptiles de Cabo Juby (NW de Africa). *Boletín de la Real Sociedad Española de Historia Natural*, 9: 354–355.



**Appendix I.**— Revised material from Morocco of the Herpetological Collection of the MNCN**Apéndice I.**— Material revisado procedente de Marruecos en la Colección de Herpetología del MNCN**Check-list of fluid preserved specimens**AMPHIBIA  
URODELA

## SALAMANDRIDAE

*Pleurodeles waltl* Michaëllès, 1830

**Tánger** (MNCN 1875-1876). **Kenitra, bosque de la Mamora** (MNCN 10041-10042, MNCN 10051-10052, MNCN 28649-28652). **Tétouan** (MNCN 16143). **Larache** (MNCN 24324). **Tánger-Acila** (MNCN 24326).

*Salamandra algira* Bedriaga, 1883

**Imassinne, Beni Seddat** (MNCN 904-907). **Chaouen** (MNCN 9609, include four specimens). **Jebel Musa** (paratypes of *Salamandra algira tingitana* Donaire Barroso and Bogaerts, 2003: MNCN 41037-41039). **Norte de Suk Thaletta, Taghramt, Jebel Bigmil** (Cadena del Haus) (paratypes of *Salamandra algira tingitana* Donaire Barroso and Bogaerts, 2003: MNCN 41040). **Jebel el Fehies** (Holotype of *Salamandra algira tingitana* Donaire Barroso y Bogaerts, 2003: MNCN 41041)

## ANURA

## ALYTIDAE

*Alytes maurus* Pasteur and Bons, 1962

**Ketama, Jebel Tidirhine** (MNCN 21653-21654).

## DISCOGLOSSIDAE

*Discoglossus scovazzi* Camerano, 1878

**Larache** (MNCN 305-310, MNCN 15120, MNCN 21163-21166, MNCN 21168, MNCN 21170, MNCN 21172, MNCN 21174, MNCN 21176, MNCN 21178, MNCN 21180, MNCN 21182, MNCN 21186, MNCN 21188, MNCN 21190, MNCN 21192, MNCN 21194, MNCN 21196, MNCN 21199, MNCN 21201, MNCN 21203, MNCN 21206, MNCN 21208, MNCN 21210, MNCN 21215, MNCN 21220, MNCN 21222, MNCN 21225, MNCN 21227, MNCN 21228, MNCN 21707). **Tamorot a Beni-Halet** (MNCN 734-740). **Tlata Ketama** (MNCN 741). **Tizi-Taca** (MNCN 742). **Arcila-Ketama** (MNCN 744). **Imassinne a Beni Seddat** (MNCN 745-749). **Essaouira** (MNCN 1357). **Tétouan** (MNCN 10181). **Tétouan, “Río Negro”** (MNCN 10182). **Boumia, río Moulouya** (MNCN 15644). **Beni Hassen, río Laou** (MNCN 16865). **Ifrane** (MNCN 41063-41064). **Kenitra** (MNCN 16147, MNCN 21229, MNCN 21231, MNCN 21233, MNCN 21235, MNCN 21237, MNCN 21239, MNCN 21241, MNCN 21244, MNCN 21247, MNCN 21249, MNCN 21251, MNCN 21253, MNCN 21256, MNCN 21260, MNCN 21261, MNCN 21263, MNCN 21265, MNCN 21266, MNCN 21267, MNCN 21269, MNCN 21271, MNCN 21273, MNCN 21275, MNCN 21277, MNCN 21279, MNCN 21283, MNCN 21285, MNCN 23515-23552). **Imouzzer** (MNCN 19709-19711).

## BUFONIDAE

*Bufo spinosus* Daudin, 1803

**Tlata Ketama** (MNCN 645). **Tánger** (MNCN 2733). **Imlil** (MNCN 2749-2751). **Tétouan** (MNCN 2758). **Tétouan, río Martil** (MNCN 25072).

*Bufoes boulengeri* (Lataste, 1879)

**Monte Arruit** (MNCN 2949). **Essaouira** (MNCN 2958-2959, MNCN 2968-2969). **Laayoune, Sahara Occidental** (MNCN 11798-11799). **Bni Ammar** (MNCN 15684). **Tétouan, río Martil** (MNCN 44279).

*Sclerophrys mauritanica* (Schlegel, 1841)

**Ketama** (MNCN 2970-2971, MNCN 2972-2973). **Tánger** (2974, 2995-2996). **Beni Ahmed** (2975). **Imlil** (MNCN 2977-2980, MNCN 3002-3003). **Tétouan** (MNCN 2982-2989). **Bab Taza** (MNCN 2991). **Tamorot, Beni Halet** (MNCN 2992-2994). **Essaouira** (MNCN 2997, MNCN 2998, MNCN 2999, MNCN 3000, MNCN 3008-3011, MNCN 3012-3016, MNCN 3017-3022). **El-Yadida** (MNCN 3004-3005). **Ras Kebdana, Cabo de Agua** (MNCN 3007). **Beni Hassen, río Laou** (MNCN 3534, 17021). **Chaouen, río Laou** (MNCN 9972-9986). **Tétouan hacia río Martil** (MNCN 15570). **Tétouan, río Martil** (MNCN 26056). **Kenitra, bosque de la Mamora** (MNCN 15586). **Beni Ammart** (MNCN 15683-15686). **Taghzaout** (MNCN 15697, MNCN 15700, MNCN 17358-17360). **Chaouen** (MNCN 17024). **Beni Melal** (MNCN 17195-17196). **Kenitra** (MNCN 17197-17207). **Lahmany, río Bou** (MNCN 18973). **Beni Arous a Asilah** (MNCN 23947). **Todgha Gorge** (MNCN 24371-24372). **Kalaa, sur de el Baine, Tétouan** (MNCN 25053-25055). **Alto Atlas** (MNCN 26057). **Tétouan, Menkal hacia Ben Karrich** (MNCN 26059-26060).

## RANIDAE

*Pelophylax saharicus* (Boulenger, 1913)

**Beni Ahmed** (MNCN 1322). **Tlata Ketama** (MNCN 1323, 1364, 1365-1369). **Ketama, Bab Chiquet** (MNCN 3596). **Essaouira** (MNCN 1324-1330, 1331-1335, 1336-1356). **Ifni, Tilivin** (MNCN 1381-1389). **Beni Hassen, río Laou** (MNCN 3537-3538). **Tánger** (MNCN 3562, 3583). **Kenitra** (MNCN 9876-9885). **Er-Rich, río Ziz** (MNCN 9887-9890). **Edchera** (MNCN 13739-13741, 13742). **Tétouan** (MNCN 15562-15568, 17182-17183). **Bzou** (MNCN 15569). **Boumia** (MNCN 15656-15657). **Entre Beni-Ammart y monte Zerhoum** (MNCN 15687). **Marrakech** (MNCN 16793). **5 km del río Laou, Chauen** (MNCN 23411). **Beni Ukra** (MNCN 40243). **Zinat-Dercherki** (MNCN 41010). **Tiliouine, río Zag Mouzen** (MNCN 44500-44501). **Río Tidili, Iouini** (MNCN 46558). **Sahara Occidental, Edchera, “Poza en Huerta de Hatri”** (paratypes of *Rana ridibunda riodeoroi* Salvador and Peris, 1975: MNCN 13739-13741), (holotype of *Rana ridibunda riodeoroi* Salvador and Peris, 1975: MNCN 13742).

*Hyla meridionalis* Boettger, 1874

**Azrou** (MNCN 3395, MNCN 3396). **Tánger** (MNCN 3414-3415). **Larache** (MNCN 3418-3419, MNCN 24229). **Beni Seddat** (MNCN 3427). **Tétouan, “Río Negro”** (MNCN 10183). **Tétouan** (MNCN 15627-15630). **De Rabat a Tánger** (MNCN 20221-20225). **Tagarit** (MNCN 45552-45557).

*Pelobates varaldii* Pasteur y Bons, 1959

**Kenitra, bosque de la Mamora** (MNCN 16241-16242, MNCN 18093-18132, MNCN 19135-19546, MNCN 22251-22293, MNCN 41013-41014). **De Larache a Alcazarquivir** (MNCN 22329-22334).

*Barbarophryne bronsgermi* (Hoogmoed, 1972)

Agadir, 137 Km S de Casablanca a Marrakech, Skhourdes-Rehama (MNCN 16616).

REPTILIA  
SQUAMATA

## COLUBRIDAE

*Macroprotodon brevis* (Günther, 1862)

Essaouira (MNCN 1742-1785, MNCN 1786-1792).  
Ketama (MNCN 8421, MNCN 23296). Tánger (MNCN 8424-8426). Tizi-Taka, Beni-Seddad (MNCN 16621).

*Hemorrhhois hippocrepsis* (Linnaeus, 1758)

Essaouira (MNCN 8973, MNCN 16552, 18001, MNCN 18003-18005). Tánger (MNCN 16643). Chauen, El Ajmas (MNCN 18002).

*Coronella girondica* (Daudin, 1803)

Ketama (MNCN 18450, MNCN 18451, MNCN 18452, MNCN 18453-18454, MNCN 46205).

*Natrix astreptophora* (López-Seoane, 1884)

Tamorot (MNCN 8654).

*Natrix maura* (Linnaeus, 1758)

Beni Seddat (MNCN 8476). Essaouira (MNCN 8570-8571). Draa el Asef, El Ajmas (MNCN 8632). Ketama (MNCN 8706). Kenhifra (MNCN 16394). Kenitra (MNCN 16412, MNCN 18162). Barranco de Sidi Mensaud, Beni-Bu-Gafar (MNCN 20074-20078). Monte Arruit, Garet (MNCN 20079). Chauen (MNCN 20085). Oued Massa (MNCN 46028).

## LAMPROPHIIDAE

*Malpolon monspessulanus* (Hermann, 1804)

Essaouira (MNCN 8870, MNCN 8881, MNCN 8890-8895, MNCN 8896-8897, MNCN 8898-8899, MNCN 8910, MNCN 8934-8939, MNCN 9043, MNCN 9044, MNCN 9045, MNCN 9046, MNCN 9047, MNCN 9048, MNCN 46194). Taourirt (MNCN 20063). Taxdirt, Cabo tres forcas (MNCN 20066). Tétouan (MNCN 39982).

*Psammophis schokari* (Forsk., 1775)

Essaouira (MNCN 46203, MNCN 46204, MNCN 23181-23182, MNCN 23183).

## VIPERIDAE

*Vipera latastei* Boscá, 1878

Cabo de Agua, frente a las Islas Chafarinas, Ras Kebdana (MNCN 20254).

*Cerastes vipera* (Linnaeus, 1758)

Cabo Juby, Tarfaya (MNCN 22992).

*Daboia mauritanica* (Gray, 1849)

Essaouira (MNCN 20256-20257).

## ELAPIDAE

*Naja haje* (Linnaeus, 1758)

Marruecos (without specific locality) (MNCN 22707).  
Sur de Marruecos (without specific locality) (MNCN 46688-46689).

## LACERTIDAE

*Acanthodactylus aureus* Günther, 1803

Sahara Occidental, Rio de Oro, Suramit (MNCN 5531).  
Sahara Occidental, Rio de Oro, Yebilatet (MNCN 5533).  
Rio de Oro (MNCN 7750-7753). Dajla (MNCN 5546-5563, MNCN 1933, MNCN 5564-5634, MNCN 18457).  
Tarfaya (MNCN 5635-5651). Smara (MNCN 14669).

*Acanthodactylus boskianus* (Daudin, 1802)

Saidia (MNCN 42168).

*Acanthodactylus erythrurus* (Schinz, 1833)

Tánger (MNCN 7580). Targuist (MNCN 7584). Beni-Ammart (MNCN 7586). Ctra. de Safi a Tánger (MNCN 7591-7601). Beni-Ahmed (MNCN 7602). Ctra. de Marrakech (MNCN 7607-7610). Cabo de Agua frente a las Islas Chafarinas (MNCN 7666). Mar Chica (MNCN 7667-7668). Essaouira (MNCN 7670-7749). Alhucemas (=Villa Sanjurjo) (MNCN 7763-7764). Tazrout (MNCN 16649). Essaouira-Tánger (MNCN 18025-18027). Asilah (MNCN 18460). Chauen, río Laou (MNCN 18461). Ketama (MNCN 21388). Isli, región Sus-Masa-Draa (MNCN 24366). Tétouan, río Martil (MNCN 39287).

*Mesalina guttulata* (Lichtenstein, 1823)

Aglimil Mel-las, Sahara occidental (MNCN 5534).

*Mesalina rubropunctata* (Lichtenstein, 1823)

Merzouga (eggs: MNCN 23319-23320)

*Podarcis vaucheri* (Boulenger, 1905)

Tlata Ketama (MNCN 6778). Imanisem, Beni Sedat (MNCN 6920-6923). De Safi a Tánger (MNCN 6977-6998). Road to Marrakech (MNCN 7237-7239). Tazrout, Bakhat (MNCN 21400-21401).

*Psammodromus algirus* (Linnaeus, 1758)

Tánger (MNCN 7822-7824). Cabo de Agua (MNCN 7847). Tánger (MNCN 15585). Tazrout (MNCN 15635). Kenitra, bosque de la Mamora (MNCN 15833). Targuist (Paratypes of *Psammodromus algirus ketamensis*: MNCN 7779-7780). El Ajmas, Yebel Magot (Paratype of *Psammodromus algirus ketamensis*: MNCN 7797). Tizi-Taka (Beni Seddat) (Paratype of *Psammodromus algirus ketamensis*: MNCN 7846). Telata Ketama (Paratypes of *Psammodromus algirus ketamensis*: MNCN 7848-7852). Telata Ketama (Holotype: MNCN 7853).

*Psammodromus microdactylus* (Boettger, 1881)

Tánger (MNCN 7879-7881).

*Timon tangitanus* (Boulenger, 1889)

Tánger (MNCN 6043). Tamorot, Beni Halet (MNCN 6056). Puente Melba, Beni Hamed (MNCN 6058). Fezzou, Atlas (MNCN 6065-6066). Ain-Kahla, Azrou (MNCN 42404).

## BLANIDAE

*Blanus tingitanus* Busack, 1988

Tánger (MNCN 8139-8141, MNCN 8151). Jebel Magot, El Ajmas (MNCN 8167). 15 km Sur de Tánger (MNCN 42170).

## TROGONOPHIIDAE

*Trogonophis wiegmanni* Kaup, 1830

El Jdida (=Mazagan) (MNCN 8215-8226). Essaouira (MNCN 8228, MNCN 8247-8275). Cabo de Agua (MNCN 8238). Tánger (MNCN 16186). Larache (MNCN 16595). Sidi Ifni, hacia Oued Assaka (MNCN 46674-46675).

## AGAMIDAE

*Agama impalearis* Boettger, 1874

Benni-Hassan (MNCN 4709). Essaouira (MNCN 4735-4736, MNCN 4738-4741, MNCN 4778-4779, MNCN 4781-4782, MNCN 4787, MNCN 4801, MNCN 4805-4807, MNCN 4808, MNCN 5020-5033). Carretera Marrakech (MNCN 4783-4786). Targuist (MNCN 4802-4804). Driuch (MNCN 4899-4900). Norte Sahara occidental (MNCN 5046). Dajla (MNCN 5544-5545). Meski (MNCN 5963). Valle del Ziz (MNCN 5964). Erfoud (MNCN 23321). Tazenakht (MNCN 45667).

*Trapelus boehmei* Wagner, Melville, Wilms & Schmitz, 2011

**Sahara Occidental, Rio de Oro, Gleib-amit** (MNCN 4708, MNCN 5522).

*Uromastyx dispar* Heyden 1827

**Sahara Occidental, Daora** (MNCN 14673).

CHAMAELEONIDAE

*Chamaeleo chamaeleon* (Linnaeus, 1758)

**Essaouira** (MNCN 5048-5049, MNCN 5057-5059, MNCN 5064-5072, MNCN 5079-5081). **Nador** (MNCN 5054, MNCN 18455). **De Smir hacia Restinga, entre Ceuta y Tétouan** (MNCN 5055). **Axdir** (MNCN 5093). **Cabo de Agua** (MNCN 5867-5069). **Atlas Medio, cascadas de Ouzoud** (MNCN 42116).

ANGUIDAE

*Hyalosaurus koellikeri* (Günter, 1873)

**Imi Aouerna, Atlas** (MNCN 7994-7995).

SCINCIDAE

*Chalcides pseudostriatus* (Caputo, 1933)

**Tánger** (MNCN 5231). **Targuist** (MNCN 5381).

*Chalcides ocellatus* (Forsskål, 1775)

**Hassi Berkane** (MNCN 5350, MNCN 5355). **Essaouira** (MNCN 5356). **Uad Alia** (MNCN 5403). **Bzou** (MNCN 15852).

*Chalcides polylepis* Boulenger, 1890

**El Yadida** (MNCN 5353-5354). **Essaouira** (MNCN 5357-5359, MNCN 5380).

*Chalcides colosii* Lanza, 1957

**Tánger** (MNCN 5373), **Ketama** (MNCN 5379, MNCN 5396).

*Chalcides mionecton* (Böettger, 1874)

**Essaouira** (MNCN 5407, MNCN 5411-5499). **Uad Alia, Rio de Oro** (MNCN 5409). **Between Tánger and Larache** (MNCN 5683-5699).

*Chalcides delislei* (Lataste and Rochebrune, 1876)

**Sahara Occidental, El Glat** (MNCN 5523).

*Chalcides sphenopsiformis* (Duméril, 1856)

**Sahara Occidental, Togba** (MNCN 5524). **Sahara Occidental, Uad Alia** (MNCN 5861-5863).

*Eumeces algeriensis* Peters, 1864

**Essaouira** (MNCN 5747-5774, MNCN 5717-5737). **Iguisen, Sahara Occidental** (MNCN 5652). **Marrakech** (MNCN 5712). **Monte Arruit, Garet** (MNCN 5738). **El Yadida** (MNCN 5739-5740). **Asedir, Beni Urriaguel** (MNCN 5744).

*Scincus albifasciatus* Boulenger, 1890

**Sahara Occidental, Dajla** (MNCN 5542-5543). **Tarfaya, Cabo Juby** (MNCN 5702)

SPHAERODACTYLIDAE

*Quedenfeldtia trachyblepharus* (Boettger, 1874)

**Fenzon, Atlas** (MNCN 4507-4508)

*Saurodactylus brossei* Bons & Pasteur, 1957

**Sahara Occidental, Guelta Zemmur** (MNCN 5539-5541).

GEKKONIDAE

*Stenodactylus mauritanicus* Guichenot, 1850

**Sahara Occidental, Rio de Oro, Krab Inekraf** (MNCN 5525). **Sahara Occidental, Tigueret** (MNCN 5527-5528). **Sahara Occidental, Rio de Oro, Dajla** (MNCN 14683). **Norte de Ain Bni Mathar** (MNCN 46672).

*Stenodactylus petrii* Anderson, 1896

**Sahara Occidental, Rio de Oro, Imlili** (MNCN 5526).

PHYLLODACTYLIDAE

*Tarentola mauritanica* (Linnaeus, 1758)

**Ctra. de Marrakech** (MNCN 4253-4257). **El Yadida** (MNCN 4316-4319). **Ketama Bab-chiket** (MNCN 4800). **Sahara Occidental, Rio de Oro, Dajla** (MNCN 5508-5512). **Tarfaya, Cabo Juby** (MNCN 5513). **Kenitra, bosque de la Mamora** (MNCN 15822). **Beni Melal** (MNCN 15844-15849). **Fes** (MNCN 15856). **Tétouan, río Laou** (MNCN 15874). **Tétouan** (MNCN 39780-39782).

*Tarentola annularis* (Geoffroy Saint-Hilaire, 1827)

**Sahara Occidental, Rio de Oro, Bir Labid** (MNCN 5517). **Sahara Occidental, Rio de Oro Adam Bir Ahamed** (MNCN 5530). **Smara** (MNCN 14666).

*Tarentola hoggarensis* Werner, 1937

**Sahara Occidental, Rio de Oro, Bir Anzarane** (MNCN 4444). **Sahara Occidental, Rio de Oro, Sidi Ahamed el Arsi** (MNCN 5514-5515). **Sahara Occidental, Rio de Oro, Auserd** (MNCN 5516). **Sahara Occidental, El Hasarat (Saguía el Hamra)** (MNCN 5518-5519). **Sahara Occidental, Rio de Oro, Krab Inekraf** (MNCN 5520).

*Tarentola chazaliae* (Mocquard, 1895)

**Sahara Occidental, Rio de Oro** (MNCN 4439-4442). **Sahara Occidental, Rio de Oro Uad Alia** (MNCN 4489). **Sahara Occidental, Rio de Oro, Dajla** MNCN 5500-5507, MNCN 14672, MNCN 14678-14679). **Sahara Occidental, Rio de Oro, El Meruseien** (MNCN 5521).

*Tropicolotes algericus* Loveridge, 1947

**Sahara Occidental, Rio de Oro, Fum Selvan** (MNCN 5535). **Sahara Occidental, Rio de Oro, Uad Meharitz** (MNCN 5536). **Sahara Occidental, Rio de Oro, El Azyir** (MNCN 5537). **Sahara Occidental, Rio de Oro, Guelta Zemmur** (MNCN 5538). **Sahara Occidental, Rio de Oro, Dakla** (MNCN 14680-14681). **Entre Ouarzazate y Zagora** (MNCN 16617). **Smara** (MNCN 14667-14668).

TESTUDINES

GEOEMIDIDAE

*Mauremys leprosa* (Schweigger, 1812)

**Tánger** (MNCN 4105). **Chaouen, El Ajmas** (MNCN 4113). **Kenitra, bosque de la Mamora** (MNCN 9488). **Ouezzane** (MNCN 9492). **Beni Mathar, Fuente de Rass-el-Haim** (MNCN 11524-11525). **Ifrane** (MNCN 15920). **Embalse de Ichtal, Chaouen** (MNCN 16523). **Río Bou, Aguelmous** (MNCN 18976). **Beni Mathar, Fuente de Rass-el-Haim** (MNCN 23660). **Río Smir, Tétouan** (MNCN 39989).

TESTUDINIDAE

*Testudo graeca* Linnaeus, 1758

**Essaouira** (MNCN 4134-4135). **Dar-es-skick (Beni-Honmart)** (MNCN 4137).

Check-list of naturalized specimens

REPTILIA

VARANIDAE

*Varanus griseus* (Daudin, 1803)

**Sahara Occidental, Rio de Oro** (MNCN 45372).

Check-list of articulated material

AMPHIBIA

ALYTIDAE

*Alytes maurus*

**Chaouen** (MNCN 40768).

DISCOGLOSSIDAE

*Discoglossus scovazzi*



**Embalse de Ichtal, Chaouen** (MNCN 15107). **Bosque de la Mamora, Kenitra** (MNCN 15108-15119). **20km de Larache a Rabat** (MNCN 15120). **Río Laou** (MNCN 15121-15123). **Imouzer** (MNCN 19709-19711) **Dayet-Aoua** (MNCN 19709-19713), **Ifrane** (MNCN 40891, 41065-41066). **Beni Hassen** (MNCN 40892). **Imouzer Kandar** (MNCN 40892).

## PELOBATIDAE

*Pelobates varaldii*

**Kenitra, bosque de la Mamora** (MNCN 16241-16242, MNCN 18093-18132, MNCN 19535-19547). **De Larache a Alcazarquivir** (MNCN 22329-22334).

## RANIDAE

*Pelophylax saharicus*

**Tlata Ketama** (MNCN 1370). **Maadid** (MNCN 20566-20571). **N'Zala** (MNCN 20572-20573). **Zynat** (MNCN 20574). **Souk el Arba** (MNCN 20575). **Chaouen** (MNCN 23411). **Without locality** (MNCN 20576-20577).

## BUFONIDAE

*Barbarophryne brongersmai*

**Agadir** (MNCN 21564). **50 Km SW Taroudant, Oual Kad** (MNCN 41031).

*Bufotes boulengeri*

**Kenitra, bosque de la Mamora** (MNCN 13254). **Sahara Occidental, Laayaoune** (MNCN 21565). **Without locality** (MNCN 40894-40896).

*Sclerophrys mauritanica*

**Tazrout** (MNCN 17358-17360). **Without locality** (MNCN 40889).

## REPTILIA

## AGAMIDAE

*Agama impalearis*

**Beni Hassen, río Laou** (MNCN 4709).

## CHAMAELEONIDAE

*Chamaeleo chamaeleon*

**Casablanca** (MNCN 19615).

## LACERTIDAE

*Mesalina rubropunctata*

**Merzouga** (MNCN 23319).

## COLUBRIDAE

*Natrix maura*

**Jenifra** (MNCN 16394). **Kenitra, bosque de la Mamora** (MNCN 16412).

## GEOEMYDIDAE

*Mauremys leprosa*

**Chaouen** (MNCN 16523).

## Check-list of transparented material

## AMPHIBIA

## ALYTIDAE

*Alytes maurus*

**Ketama** (MNCN 20917)

## DISCOGLOSSIDAE

*Discoglossus scovazzi*

**Embalse de Ichtal, Chaouen** (MNCN 15107, MNCN 15220-15221). **Chaouen** (MNCN 15222). **Bosque de la Mamora, Kenitra** (MNCN 15108-15119). **20km de Larache a Rabat** (MNCN 15120, MNCN 21164-21165, MNCN 21267, MNCN 21169, MNCN 21171, MNCN 21173, MNCN 21175, MNCN 21177, MNCN 21179, MNCN 21181, MNCN 21183- 21185, MNCN 21187, MNCN 21189, MNCN 21191, MNCN 21193, MNCN 21195, MNCN 21197-21198, MNCN 21200, MNCN 21202, MNCN 21204, MNCN 21205, MNCN 21207, MNCN 21209, MNCN 21211-21214, MNCN 21216-21219, MNCN 21221, MNCN 21223-21224, MNCN 21226, MNCN 21228, MNCN 41011). **Kenitra** (MNCN 20235-20238, MNCN 21230, MNCN 21232, MNCN 21234, MNCN 21236, MNCN 21238, MNCN 21240, MNCN 21242-21243, MNCN 21245-21246, MNCN 21248, MNCN 21250, MNCN 21252, MNCN 21254, MNCN 21255, MNCN 21257, MNCN 21258-21259, MNCN 21262, MNCN 21264, MNCN 21268, MNCN 21270, MNCN 21272, MNCN 21274, MNCN 21276, MNCN 21278, MNCN 21280, MNCN 21281, MNCN 21282, MNCN 21284, MNCN 21286-21289). **Ifrane** (MNCN 41061-41062). **Río Laou** (MNCN 15121-15123). **Imouzer** (MNCN 19709-19711). **Dayet-Aoua** (MNCN 19709-19713). **Beni Hassen** (MNCN 40892). **Ifrane** (MNCN 40891). **Imouzer Kandar** (MNCN 40892).

## HYLIDAE

*Hyla meridionalis*

**Entre Rabat y Tánger** (MNCN 20221-20225).

## PELOBATIDAE

*Pelobates varaldii*

**Without locality, Morocco** (MNCN 19833), **Kenitra** (MNCN 22251-22293).

## RANIDAE

*Pelophylax saharicus*

**Ksar Maadid** (MNCN 20546-20551, 20566-20571). **Krairba** (MNCN 20552). **N'zala** (MNCN 20553-20554, 20572-20573). **Ifrane** (MNCN 20555). **Zynatt** (MNCN 20574). **Krair** (MNCN 20576-20577). **Souk El Arbaa** (MNCN 20556, 20575).

## BUFONIDAE

*Barbarophryne brongersmai*

**50 Km SW Taroudant, Oual Kad** (MNCN 41030).

*Bufotes boulengeri*

**Without locality** (MNCN 40894-40896).

*Sclerophrys mauritanica*

**Without locality** (MNCN 40889).

**Appendix II.**— Geographic coordinates from the localities listed in Appendix I. Not found localities or wide regions lack the coordinate's data.

**Apéndice II.**— Coordenadas geográficas de las localidades citadas en el apéndice I. Localidades no encontradas o amplias regiones se muestran sin coordenadas.

Locality	Coordenates	Locality	Coordenates
Adam Bir Ahamed, Rio de Oro, Sáhara occidental		El Azyir, Sáhara Occidental	
Agadir	30.43° N, 9.60° W	El Glat, Sáhara Occidental	22.50° N, 14.18° W
Aglimil Mel-las, Sáhara occidental		El Hasarat, Saguía el Hamra, Sáhara Occidental	
Aguelmous	33.16° N, 5.84° W	El Meruseien	
Ain Bni Mathar	34.01° N, 2.03° W	El-Yadida	33.22° N, 8°53 W
Ain-Kahla	32.97° N, 6°91° W	Embalse de Ichtal, Chaouen	35.24° N, 5.29° W
Alcazarquivir	35.00° N, 5.91° W	Erfoud	31.44° N, 4.23° W
Alhucemas	35.24° N, 3.93° W	Er-Rich	32.26° N, 4.49° W
Alto Atlas		Essaouira	31.49° N, 9.75° W
Arcila	35.46° N, 6.03° W	Fenzon, Alto Atlas	
Asedir, Beni Urriaguel		Fez	34.07° N, 5.05° W
Auserd	22.55° N, 14.33° W	Fezzou, Atlas	
Axdir	35.20° N, 3.91° W	Fuentes de Rass-el-Haim, Ain Bni Mathar	34.01° N, 2.03° W
Azrou	33.44° N, 5.23° W	Fum Selvan, Sáhara Occidental	
Bab Chiquet, Ketama		Garet, Monte Arruit	35.00° N, 3.03° W
Bab Taza	35.06° N 5.20° W	Gleib-amit, Sáhara Occidental	
Bakhat		Guelta Zemmur	25.14° N, 12.37° W
Ben Arouse	34.7 °N, 5.20° W	Hassi Berkane	34.84° N, 2.87° W
Ben Karrich	35.51° N, 5.43° W	Ifni	29.37° N, 10.18° W
Beni Ahmed	34.78° N, 4.53° W	Ifrane	33.52° N, 5.11° W
Beni Ammart	34.81° N, 4.16° W	Iguidsen, Sáhara Occidental	23.77° N, 14.50° W
Beni Bu Gafar		Imassinne, Beni Seddat	34.94° N, 4.49° W
Beni Halet	34.97° N, 4.88° W	Imi Aouerna, Atlas	
Beni Hassen	35.32° N, 5.36° W	Imlil	31.14° N, 7.92° W
Beni Melal	32.34° N, 6.37° W	Imlili	23.23° N, 16.08° W
Beni Seddat	34.95° N, 4.51° W	Imouzzer	30.67° N, 9.48° W
Beni Ukra		Imouzzer Kandar	33.73° N, 5.02° W
Bir Anzarane	23.89° N, 14.54° W	Iouini, río Tidili	30.93° N, 7.34° W
Bir Labid		Isli	31.24° N, 7.15° W
Boumia	32.73° N, 5.10° W	Jebel Bigmil	
Bzou	32.09° N, 7.05° W	Jebel el Fehies	
Cabo de Agua, Ras Kebdana	35.14° N, 2.43° W	Jebel Magot, Chaouen	
Cabo Juby	27.95° N, 12°92 W	Jebel Musa	35.89° N, 5.40° W
Casablanca	33.57° N, 7.59° W	Jebel Tidirhine	34.84° N, 4.52° W
Cascadas de Ouzouz	32.02° N, 6.72° W	Jenifra	32.93° N, 5.66° W
Chaouen	35.17° N, 5.27° W	Kalaa, sur de el Baine, Tetouan	
Dajla	23.72° N, 15.93° W	Kenitra	34.24° N, 6.58° W
Daora, Sáhara Occidental		Ketama	34.91° N, 4.57° W
Dar-es-skick (Beni-Honmart)		Krab Inekraf, Sáhara Occidental	
Dayet-Aoua	33.65° N, 5.03° W	Krair	
Draa el Asef, El Ajmas	35.08° N, 5.36° W	Krairba	
Driuch	34.98° N, 3.40° W	Ksar Maadid	31.46° N, 4.20° W
Edchera	27.03° N, 13.07° W	Laayoune	27.15° N, 13.20° W
El Ajmas	35.08° N, 5.32° W	Lahmanyil, río Bou	

Locality	Coordenates	Locality	Coordenates
Larache	35.17° N, 6.15° W	Tagarit	30.71° N, 9.78° W
Mamora forest	34.08° N, 6.65° W	Taghramt	35.79° N, 5.47° W
Mar chica	35.20° N, 2.93° W	Taghzaout	30.54° N, 9.71° W
Marrakech	31.69° N, 8.00° W	Tamorot	34.94° N, 4.78° W
Menkal		Tanger	35.76° N, 5.83° W
Merzouga	31.10° N, 4.00° W	Taourirt	34.40° N, 2.89° W
Meski		Tarfaya	27.94° N, 12.93° W
Monte Arruit	35.01° N, 3.01° W	Targuist	34.94° N, 4.31° W
Nador	35.19° N, 2.93° W	Taroudant	30.47° N, 8.87° W
N'Zala		Taxdirt, Cabo tres forcas	35.31° N, 3.03° W
Oual Kad, 50km Sur de Taroudant	29.99° N, 8.91° W	Tazenakht	30.57° N, 7.20° W
Ouarzarate	30.93° N, 6.94° W	Tazrout	34.73° N, 4.11° W
Oued Massa	30.08° N, 9.66° W	Tétouan	35.59° N, 5.36° W
Ouezzane	34.79° N, 5.57° W	Tigueret	
Puente Melba		Tiliouine	31.25° N, 6.99° W
Rabat	33.94° N, 6.88° W	Tizi-Taca, Beni Seddat	
Río Martil	35.60° N, 5.34° W	Tlata Ketama	34.87° N, 4.62° W
Safi	32.30° N, 9.23° W	Todgha Gorge	31.52° N, 5.53° W
Saidia	35.08° N 2.24° W	Togba, Sáhara Occidental	22.85° N, 15.78° W
Sidi Ahamed el Arsi		Uad Alia	24.47° N, 14.75° W
Sidi Mensaud, Beni-Bu-Gafar	35.27° N, 3.09° W	Uad Meharitz	
Smara	26.74° N, 11.68° W	Valle del Ziz	32.10° N, 4.36° W
Smir hacia Restringa	35.77° N, 5.35° W	Yebilatet	
Souk el Arba	34.68° N, 5.99° W	Zagora	30.34° N, 5.85° W
Suk Thaleta		Zerhoun	34.03° N, 5.52° W
Suramit		Zinat	35.46° N, 5.40° W