Zootaxa 3795 (5): 501–522
www.mapress.com/zootaxa/
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Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3795.5.1
http://zoobank.org/urn:lsid:zoobank.org:pub:3034E613-829A-4E56-A860-CA2A7C23B8FA

Disentangling the *Pelomedusa* complex using type specimens and historical DNA (Testudines: Pelomedusidae)

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Abstract

Recent research has shown that the helmeted terrapin (*Pelomedusa subrufa*), a species that occurs throughout sub-Saharan Africa, in Madagascar and the southwestern Arabian Peninsula, consists of several deeply divergent genetic lineages. Here we examine all nominal taxa currently synonymized with *Pelomedusa subrufa* (Bonnaterre, 1789) and provide mitochondrial DNA sequences of type specimens or topotypic material for most taxa. Lectotypes are designated for *Testudo galeata* Schoepff, 1792, *Pentonyx capensis* Duméril & Bibron, 1835, *Pelomedusa nigra* Gray, 1863, *Pelomedusa galeata* var. *disjuncta* Vaillant & Grandidier, 1910, and *Pelomedusa galeata damarensis* Hewitt, 1935. For *Pelomedusa gasconi* Rochebrune, 1884, a taxon without preserved type material, a neotype is designated. Type material of *Pentonix americana* Cornalia, 1849, a nominal species without credible type locality, is lost and its identity remains questionable. Also the holotype of *Pelomedusa galeata orangensis* Hewitt, 1935 is lost, but its allocation to the only genetic lineage occurring in South Africa is unambiguous. Phylogenetic analyses of type sequences or topotypic material reveal that the remaining nominal taxa represent three of the nine previously identified lineages of *Pelomedusa*. Among these three lineages is the South African one. Type specimens of *Pentonyx gehafie* Rüppell, 1835 correspond to an additional distinct lineage. The present study provides a sound basis for a subsequent integrative taxonomic revision of the *Pelomedusa* complex.

Key words: Africa, Arabian Peninsula, Madagascar, nomenclature, type specimen

Introduction

Helmeted terrapins (*Pelomedusa subrufa*) are widely distributed over sub-Saharan Africa, Madagascar and the southwestern Arabian Peninsula (Iverson 1992; Ernst *et al.* 2000; Boycott & Bourquin 2008) and thought to represent an example of a pan-African reptile species (Wong *et al.* 2010; Barlow *et al.* 2013). With maximum shell lengths of 20–32.5 cm (Ernst *et al.* 2000), helmeted terrapins are a small to medium-sized species and adapted to a peculiar life style. These terrapins use small, often temporary water bodies. If these dry out, the terrapins burrow underground and remain there until more favourable conditions return. Moreover, the terrapins are able to move great distances overland, allowing them to occur in quite arid regions. Helmeted terrapins thus occupy a unique ecological niche among African freshwater turtles (Boycott & Bourquin 2008; Branch 2008).

Currently, *P. subrufa* is treated as monotypic (Gasperetti *et al.* 1993; Fritz & Havaš 2007; Boycott & Bourquin 2008; van Dijk *et al.* 2012), even though many previous authors recognized two or three distinct subspecies before Gasperetti *et al.* (1993) questioned the reliability of their diagnostic morphological characters. However, using mitochondrial and nuclear DNA sequences, two recent papers (Vargas-Ramírez *et al.* 2010; Wong *et al.* 2010) revealed deep genealogical lineages in *P. subrufa*, suggesting that *Pelomedusa* represents rather a species complex

Accepted by S. Carranza: 10 Mar. 2014; published: 15 May 2014

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Acknowledgements

Erik Åhlander (Swedish Museum of Natural History, Stockholm), Lars Lundqvist (Biological Museum, Lund University), Stefano Scali (Museo Civico di Storia Naturale di Milano), and Beryl Wilson (McGregor Museum, Kimberley) provided information about *Pelomedusa* specimens in their care and helped to verify their type status. Wolfgang Böhme (Zoologisches Forschungsmuseum Alexander Koenig, Bonn), Roger Bour (Muséum National d'Histoire naturelle, Paris), Heinz Grillitsch (Naturhistorisches Museum, Vienna), Gunther Köhler (Senckenberg Museum, Frankfurt am Main), Mark-Oliver Rödel (Museum für Naturkunde, Berlin), and Gill Watson (Port Elizabeth Museum) allowed access to or sampling of museum specimens and types. Eric Rittmeyer (Louisiana State University, Museum of Natural Sciences) clarified the identity of GenBank sequences of two LSUMZ specimens. Raffael Ernst and Markus Auer (Museum für Tierkunde, Senckenberg Dresden) assisted with handling specimens. Lars Lundqvist and Enrico Morawa took some photos of type specimens and Matjaž Gregorič provided a photo of a live helmeted terrapin.

TABLE S1. Used samples, GenBank sequences and their accession numbers.
TABLE S2. Primer sequences for mtDNA fragments for fresh samples. Nucleotides in brackets represent variable positions.
TABLE S3. Primer sequences and lengths of amplified PCR products of mtDNA fragments of the 12S, cyt *b* and ND4 genes for historical samples.
TABLE S4. PCR conditions for historical and fresh samples.
TABLE S5. Degree of overlap for individual mtDNA fragments yielding 251–252 bp of the 12S rRNA gene.
TABLE S6. Degree of overlap for individual mtDNA fragments yielding 319 bp of the cyt *b* gene.
TABLE S7. Degree of overlap for individual mtDNA fragments yielding 437 bp of the ND4 gene.
TABLE S8. Partitioning scheme and models selected by the Akaike Information Criterion in MrMODELTEST 2.3 (Nylander 2004).

The Supporting Information is available from the Dryad Repository using the link http://dx.doi.org/10.5061/dryad.rd37p

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