



Mind the gap—Is the distribution range of *Pelomedusa galeata* really disjunct in western South Africa?

¹Melita Vamberger, ¹Paula Ribeiro Anunciação, ²Margaretha D. Hofmeyr, and ¹Uwe Fritz

¹Museum of Zoology, Senckenberg Natural History Collections Dresden, A.B. Meyer Building, 01109 Dresden, GERMANY ²Chelonian Biodiversity and Conservation, Department of Biodiversity and Conservation Biology, University of the Western Cape, Bellville 7535, SOUTH AFRICA

Abstract.—Records from the putative gap in the distribution range of *Pelomedusa galeata* in western South Africa provide evidence for the occurrence of helmeted terrapins in those areas. Further research is needed to reveal the genetic and taxonomic identity of these populations.

Keywords. helmeted terrapin, Northern Cape Province, Pelomedusidae, Testudines, turtle

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Helmeted terrapins have a wide distribution across sub-Saharan Africa and the southwestern Arabian Peninsula. Together with their sister taxon, the African hinged terrapins (*Pelusios*), helmeted terrapins constitute the side-necked turtle family Pelomedusidae (TTWG 2017). While it was assumed for decades that all helmeted terrapins are conspecific (Boycott and Bourquin 2008; Branch 2008; Ernst and Barbour 1989; Wermuth and Mertens 1961, 1977), several investigations revealed deep genetic divergences between geographically coherent populations, which resemble or exceed the divergences of distinct *Pelusios* species (Fritz et al. 2011, 2014; Petzold et al. 2014; Vamberger et al. 2018; Vargas-Ramírez et al. 2010; Wong et al. 2010). This resulted in the formal recognition of no less than 10 distinct species (Petzold et al. 2014; TTWG 2017; Vamberger et al. 2018). In addition to these, a minimum of five unnamed species are thought to exist, which are characterized by similar genetic divergences but otherwise only insufficiently known (Fritz et al. 2015; Nagy et al. 2015; Petzold et al. 2014; Vamberger et al. 2018; Vargas-Ramírez et al. 2016).

In the Southern African region south of the Cunene and Zambezi Rivers, two species are known to occur, the South African Helmeted Terrapin *Pelomedusa galeata* (Schoepff, 1792) and the Common Helmeted Terrapin *Pelomedusa subrufa* (Bonnaterre, 1789) (Fritz et al. 2015; Petzold et al. 2014; Vamberger et al. 2018). *Pelomedusa galeata* is distributed in most of South Africa and replaced in the countries north of South Africa by *P. subrufa*, which enters also northeastern South Africa (provinces of Limpopo and Mpumalanga). In these

provinces, the distribution ranges of the two species abut and the closest records of *P. galeata* and *P. subrufa* are separated only by 80 km, so that overlapping ranges seem possible (Vamberger et al. 2018). *Pelomedusa galeata* shows pronounced phylogeographic structuring, with two genetically deeply divergent groups in the east and west of South Africa that most likely represent two distinct species. The eastern group is phylogeographically structured, with three parapatric subgroups (Fritz et al. 2015; Petzold et al. 2014; Vamberger et al. 2018).

Detailed distribution maps for helmeted terrapins show a patchy range for Southern Africa, with large putative gaps in western South Africa, southern Mozambique, southern Namibia, and most of Botswana (Boycott 2014; Boycott and Bourquin 2008; TTWG 2017). Except for southern Mozambique, these regions are very arid, suggestive of pessimal conditions for a freshwater turtle like the helmeted terrapin. However, *P. subrufa* is known to cope with year-long drought. In Namibia (Omaheke), terrapins of this species may evidently survive up to six years burrowed in the soil (Petzold et al. 2014) and surface only after the rare rainfalls. Boycott and Bourquin (2008) suggested that helmeted terrapins take advantage of man-made farm dams and expanded their range into otherwise unsuitable regions, including semi-desert. However, records for *P. subrufa* from the mouths of temporary streams in the Namib Desert may well represent natural occurrences of terrapins washed downstream during the rare floods there (A. Schleicher, pers. comm.).

One large distribution gap is located in western South Africa and concerns *P. galeata*. It more or less separates the two genetically deeply divergent groups of this species (Vamberger et al. 2018). During fieldwork in October and November 2018, the first two authors

Correspondence. *uwe.fritz@senckenberg.de



Fig. 1. *Pelomedusa galeata* from the Ratelfontein farm near Calvinia observed directly after rainfall, 16 February 2019. For the location of the farm, see Fig. 2 (locality 1). Photos: C.A. van Niekerk.

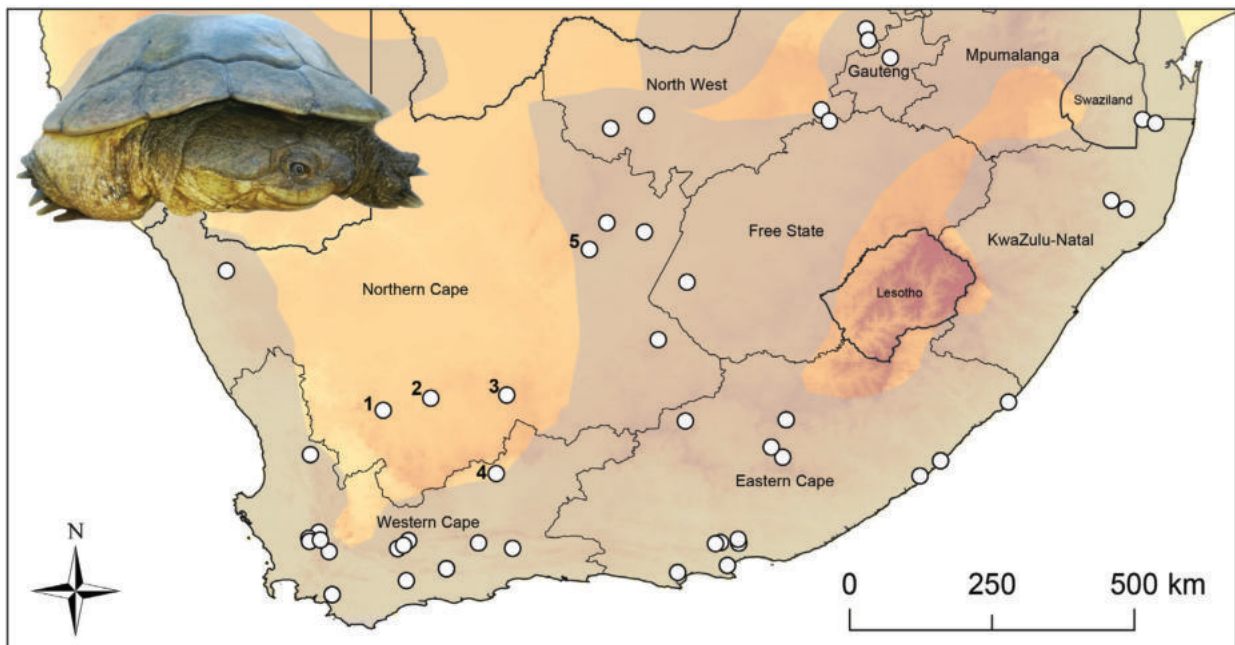


Fig. 2. Distribution range of Helmeted Terrapins (shaded in grey), with our records of *Pelomedusa galeata* in South Africa (white circles). New records of *P. galeata* in or close to the putative distribution gap: 1 – Nineteen turtles at Ratelfontein farm, near Calvinia (16 February 2019), 2 – Observations of locals at Williston, 3 – Near Carnarvon (shell, collected 25 October 2018), 4 – One terrapin near Beaufort West (4 March 2017), 5 – Two terrapins near Griekwastad (28 October 2018). Inset: *Pelomedusa galeata* from the Ratelfontein farm. Photo: C.A. van Niekerk.

had the opportunity to examine parts of this putative distribution gap for the presence of helmeted terrapins. In addition to direct observations, interviews with farmers and locals contributed further information. It is common knowledge there that helmeted terrapins are present but very scarce. They are seen only after the rare rainfall events, when the terrapins are walking to waterholes (Fig. 1). Together with our records substantiated by specimens,

this provides the first evidence for the occurrence of *P. galeata* in the central part of the Northern Cape Province of South Africa (Fig. 2). We assume that the helmeted terrapin has an even wider distribution and also occurs northwards to Namibia, and that a distribution gap does not exist at all. *Pelomedusa* are very elusive animals in arid regions, and we presume that the putative gap reflects not a real absence of helmeted terrapins but

a lack of records. Further research is needed to reveal which genetic lineage of *P. galeata* occurs in this area and whether there is a contact zone of the two lineages currently identified with *P. galeata*.

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Melita Vamberger is a Slovenian herpetologist and evolutionary biologist working at the Senckenberg Natural History Collections, Dresden, Germany. Melita studied Biology at the University of Ljubljana, Slovenia, focusing on the natural history of the European Pond Turtle (*Emys orbicularis*). After her diploma, she moved to Germany for her Ph.D. at the University of Leipzig on the phylogeography and hybridization of two closely related freshwater turtle species (*Mauremys caspica* and *M. rivulata*). Melita's main interests are speciation, gene flow, adaptation, and evolution of different turtle taxa using an integrative approach that combines genetic and ecological methods, especially in the Western Palearctic and sub-Saharan Africa.



Paula Ribeiro Anunciação is a Brazilian ecologist and herpetologist. She is mainly interested in the consequences of human disturbance for tropical amphibian communities. Paula studied biology at the Federal University of Alfenas, Minas Gerais, Brazil. There, she also earned her master's degree in Ecology and examined the influence of matrix types and habitat fragmentation on the amphibian diversity of the Atlantic rainforest. Paula earned her Ph.D. in Applied Ecology at the Federal University of Lavras, Minas Gerais, Brazil, in 2018. For her Ph.D., she studied the relationships of land use change, climate change, and taxonomic and functional richness of amphibians, which included some months of work at the Senckenberg Natural History Collections, Dresden, Germany.



Margaretha D. Hofmeyr is Professor Emerita at the Biodiversity and Conservation Biology Department, University of the Western Cape, South Africa. She is an ecophysiologicalist by training and first studied large ungulates before switching to chelonians. Her ecophysiological studies revealed that South African tortoises have many unique characteristics, which stimulated her interest in their genetic diversity and systematics. Margaretha has published extensively on the ecology and phylogeography of sub-Saharan tortoises and turtles, and she is closely involved in conservation projects that focus on threatened tortoises. This work resulted in her being awarded the 2015 Sabin Turtle Conservation Prize. Margaretha is a member, and Regional Vice-Chair for Africa, of the IUCN/SSC TFTSG and she coordinated the 2014 and 2018 Red List Assessments for South African tortoises and freshwater turtles.



Uwe Fritz is the head of the Museum of Zoology, Senckenberg Natural History Collections at Dresden, Germany, and Extraordinary Professor for Zoology at the University of Leipzig, Germany. He has worked for many years on the taxonomy, systematics, and phylogeography of turtles and tortoises, and also studied to a lesser extent snakes and lizards. Uwe is particularly interested in hybridization patterns and gene flow in contact zones of distinct taxa. He has authored or co-authored numerous scientific articles, mainly in herpetology, and has also edited proceedings and books, among them the two turtle volumes of the *Handbook of Amphibians and Reptiles of Europe*.