Rapid Survey of Amphibians and Reptiles in the Boké Region, Northwestern Guinea

Authors: Hillers, Annika, Alhassane Bangoura, Mohamed, Soua Loua, Néma, and Rödel, Mark-Oliver

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Chapter 6

Rapid survey of amphibians and reptiles in the Boké region, northwestern Guinea

Annika Hillers, Mohamed Alhassane Bangoura, Néma Soua Loua and Mark-Oliver Rödel

SUMMARY

During the herpetological survey of three districts in the Boké region, we recorded at least 26 amphibian and 11 reptile species. Most of the recorded species were connected to savanna or farmbush habitats and have a distribution area that exceeds the Upper Guinean forest block or even West Africa. Only a few species were typical forest specialists. For several species our records are large range extensions. Others need further examination to determine their taxonomic status; one species might be new to science. Four of the detected reptile species are threatened and listed under CITES.

As there was no rain during the entire RAP period, the weather conditions were not favourable for the investigations of the herpetological fauna. Further research is needed to comment on the Boké region's comprehensive herpetological diversity. Due to the availability of many different habitat types, there might exist a surprisingly high diversity for lower Guinea, given the high degree of degradation in some parts of the Boké region. The regional herpetofauna faces different threats, especially the destruction of suitable habitats.

INTRODUCTION

While the forested areas of Guinea, especially in the south eastern part of the country, have been the target of several herpetological surveys (e.g. Guibé and Lamotte 1958a, 1958b, 1963; Schiøtz 1967, 1968; Böhme 1994a, 1994b; Rödel and Bangoura 2004; Rödel et al. 2004; Greenbaum and Carr 2005) the knowledge of the herpetofauna in lower Guinea and in the north of the country is still scarce. The fact that the Guinean forest habitats are among the most diverse African regions in respect to amphibians (Rödel and Bangoura 2004; Rödel et al. 2004) may be a hint that also the savanna and farmbush habitats provide or provided suitable habitats for a great number of species depending on the particular degree of habitat degradation. This could also be true for the Boké region. Facing different threats like habitat destruction and alteration as well as increasing bauxite mining activity in this area, the knowledge of present amphibian and reptile species is urgently needed. These organisms are extremely sensitive to habitat changes, thus they are significant bio-indicators. The composition of amphibian assemblages might therefore reflect the degree of habitat degradation and destruction (compare Rödel and Branch 2002; Rödel and Ernst 2003) eventually caused by the mining activities or certain agricultural practices.

During our investigations we concentrated on amphibians, as there are standardized methods to investigate these organisms, while reptile records were gathered by chance. In general the dry weather conditions at the end of the dry season were not favourable for the investigations of the herpetofauna. There was no rain during the entire RAP period and we are sure to be far from having a representative picture of the amphibians' and especially reptiles' biodiversity at the different sites in the Boké region. Nevertheless, we are able to provide some useful conservation recommendations.

STUDY SITES AND METHODS

The RAP survey was carried out at the end of the dry season between 22 April and 12 May 2005. Field work was done in different areas within the Boké region in lower Guinea (districts of Kolaboui/Rio Kapatchez, Kamsar and Sangaredi). This region is characterized by dry plains and a few island forests. There are neighbouring mangroves in the areas of Rio Kapatchez and Kamsar (district of Kolaboui and Kamsar) and two big streams, Kogon and Tinguilinta, surrounded by savanna and hilly savanna at Bowal (district of Sangaredi).

Appendix 5 shows a list of investigated sites, their geographic position, date of sampling and a short description of the respective habitat.

We tried to search all present habitat types at the different study sites with equal effort, although due to the dry weather we had to concentrate on those places where there was some freshwater habitat left.

At the first study area (Rio Kapatchez area) we mainly concentrated on places in and around the remaining forest (a 15 year old secondary forest) of the village Sarabaya, including flowing water or any other water bodies around plantations.

The study sites around Kamsar (Site 2) differed a lot in regard to their freshwater availability. Most of the sites were characterized by large ranges of mangroves and contained very few bodies of fresh water. Sometimes the freshwater habitat was reduced to wells near or in villages.

In the last study area Sangaredi (Site 3), we concentrated on the gallery forests along the different streams and rivers of the region. These were the only available freshwater habitats that were surrounded by dry savanna habitat.

Specimens were mainly recorded opportunistically during visual surveys by up to five people. The surveys were undertaken during day and night. Searching techniques included visual scanning of the terrain and investigation of potential refuges as well as acoustical monitoring (see also Heyer et al. 1994; Rödel and Bangoura 2004). As there was no rain during the entire investigation period, the reproductive activity (i.e. the number of calling males) was very limited. Most of the records were thus done by visual encounters.

Additional to visual and acoustic monitoring, drift fences and pitfall traps were installed in the first (Sarabaya) and the last (Sangaredi) study area. But the results of trapping did not add any supplementary species to our species list and are therefore not presented within this report.

As our sampling design provides only qualitative and semi-quantitative data we calculated the estimated species richness and sampling efficiency with the Chao 2 and Jackknife 1 estimators (programm: EstimateS, Colwell 2005). These estimators are incidence based, calculating with the presence/absence data of the daily species lists (15 days) for 26 species. The sampling effort was measured in man-hours spent searching at each study site and it was assumed that the sampling effort was the same for each habitat

To obtain quantitative data, mark-recapture experiments along standardized transects or on definite plots would have been necessary. The study period was too limited for these techniques as it was restricted to five days in each area.

The nomenclature of amphibians mainly follows Frost (2004). Some voucher specimens were anesthetized and killed in a chlorobutanol solution and preserved in 70% ethanol. Voucher specimens were deposited at MOR's (Mark-Oliver Rödel) collection and some will be transferred to natural history museums. Tissue samples (toe tips) were preserved in 95% ethanol. These samples are stored at the Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, The Netherlands. Geographical positions were taken with a hand-held GPS receiver (Garmin 72).

RESULTS

Species richness and community composition:

We were able to record at least 26 amphibian species and 11 reptile species at the different sites under investigation. A total list of amphibian species with site records, known habitat preference and distribution area is given in Table 6.1. The list of detected reptile species with site records is shown in Appendix 7. Four of the encountered species are threatened and protected by CITES (*Chamaeleo gracilis* (II), *Varanus niloticus* (II), *Python regius* (II), and *Pelusios castaneus* (III)).

A high number of the registered amphibian species (ten species, 38.5%) has a distribution area exceeding West Africa. Seven species (26.9%) are restricted to West Africa, eight (30.8%) only occur in the Upper Guinean region and one species (3.9%) might be new to science and endemic to the Boké region (Table 6.1). The majority of amphibians showed a preference for savanna and farmbush habitats. This explains the high number of widely distributed species. In general, savanna connected species show a wider distribution over the African continent than forest dependent species. Nevertheless, we also encountered some typical forest species, most of them being endemic to the Upper Guinean forest area (Table 6.1).

Calculations using the two incidence based species richness estimators reveal that more species are likely to occur in the investigated area. With the Chao 2 and the Jackknife 1 estimator, 30 to 31 amphibian species were calculated to occur in the Boké region (Figure 6.1). The number of recorded species hence corresponds to 84 to 86% of the computed regional species richness. The calculated number of species is assumed to be underestimated (see discussion).

Table 6.1. Amphibian species recorded in the Boké region with site records (see Appendix 5), habitat preference and African distribution of species. S = savannah, FB = farmbush (degraded forest and farmland), F = forest, A = Africa (occurs also outside West Africa), WA = West Africa (Senegal to eastern Nigeria), UG = Upper Guinea (forest zone West of the Dahomey Gap), E = endemic to Boké region, * = records possibly comprise several species, sp. = determination needs confirmation or new species are involved.

Species	Site	S	FB	F	A	WA	UG	E
Arthroleptidae								
Arthroleptis sp. *	KOL3,4,6 KAM6 SAN1,2,5,6,8,9,10	x	x	x			x	
Astylosternidae								
Astylosternus cf. *occidentalis*	SAN6			x			x	
Bufonidae								
Bufo maculatus	KAM8 SAN4	x	x		x			
Bufo regularis	KOL1,2,3 KAM1,5 SAN1,3,4	x	x		x			
Bufo sp.	KAM 1,2 SAN1,3			x			x	
Hyperoliidae								
Hyperolius occidentalis	KOL1 SAN1	x	x				x	
Hyperolius sp.	KAM5 SAN3,4	x	x			?		
Hyperolius spatzi	KOL1,5 KAM5,7	x					x	
Leptopelis hyloides	KOL1,6		x	x		x		
Leptopelis viridis	KAM8	x			x			
Petropedetidae								
Phrynobatrachus francisci	KOL1,2,5 KAM4,5,6,8 SAN1,2,3,5,	x				x		
Phrynobatrachus gutturosus	KOL4,6 SAN3		x	x		x		
Phrynobatrachus natalensis	KOL5	x	x		x			
Phrynobatrachus sp.1	KAM4		?			?		
Phrynobatrachus sp.2	SAN2			?				?
Phrynobatrachus tokba	KOL5 KAM4,5 SAN2,3		x	x			x	
Pipidae								
Silurana tropicalis	KOL3		x	x		x		
Ranidae								
Hoplobatrachus occipitalis	KOL1,4,5 KAM4,8 SAN1	x	x		x			
Ptychadena bibroni	KOL1,3,6, KAM1,2,5,7,8	x	x		x			
Ptychadena mascareniensis	KAM5,6,8		x		x			
Ptychadena oxyrhynchus	KOL4 KAM5,8 SAN2	x			x			

Species	Site	S	FB	F	A	WA	UG	E
Ptychadena pumilio	KOL1,2,3,5 KAM3,4,5,6,8 SAN2,4	x	x		x			
Ptychadena retropunctata	SAN1,2,6	x	x				x	
Ptychadena sp.	KOL5 KAM1,6	x	x			?		
Ptychadena tellinii	SAN2,4,7	x	x		x			
Ptychadena tournieri	KAM3,5,6,7 SAN2		x				x	

Notes on species:

We only comment on a few species that are of uncertain taxonomic status, not well known or notable in other concerns.

Arthroleptis spp.

It is not possible to determine definite species within this genus (Rödel and Branch 2002; Rödel and Agyei 2003). Intraspecific variation largely overlaps with interspecific variation (Rödel and Bangoura 2004). Morphological characteristics or colour patterns do not allow a distinction of species. They only vary in advertisement calls or on genetic level. Due to the dry weather and lack of rainfall, there were no calling males during the RAP period. Given the fact that we found the specimens in very different habitats, in the more or less open farmbush land and in gallery forest, we assume that there exist two different *Arthroleptis* species in the Boké region. Their status needs to be verified in comparison with *Arthroleptis* species of other Upper Guinean regions as well. One of the two observed *Arthroleptis* species might be conferred to *Arthroleptis poecilonotus* Peters 1863, which is described to occur occasionally in moist savanna (Rödel 2000; IUCN et al. 2004).

Ptychadena retropunctata Angel 1949.

There is only sparse knowledge concerning the extent of occurrence or the ecological requirements of this species. Until now *Ptychadena retropunctata* was known only from the Loma Mountains in Sierra Leone, Mont Béro in Guinea and Mont Nimba in Guinea and Liberia. Its preferred habitat is described to be savanna and grass steppe (IUCN et al. 2004). During the RAP survey it was recorded in gallery forests within hilly savanna habitat where it was very abundant. These findings may support the suggestion of Rödel et al. (2004) that *Ptychadena retropunctata* retreats into the forest habitat during the dry season and hence needs adjacent forest and savanna habitats to survive.

Ptychadena tellinii Peracca 1904.

The record of *Ptychadena tellinii* in the Boké region proves to be the second record for this species in Guinea at all. For the first time it was observed in 2002 in the Upper Guinea National Park (Greenbaum and Carr 2005). *Ptychadena tellinii* was shown to be a synonym of *Ptychadena schubotzi* Sternfeld 1917 by Largen (2001).

Several of the amphibian species recorded in the Boké region had never before been detected at latitudes so far north in West Africa. This range extension was shown for the species *Astylosternus* cf. *occidentalis, Leptopelis hyloides, Phrynobatrachus gutturosus, Phrynobatrachus tokba, Ptychadena retropunctata*, and *Ptychadena tellini.* Until now their Guinean distribution range was restricted to the southern central (Haut Niger NP) or south-eastern part of the country.

Some of the recorded amphibians need further examination to determine their taxonomy. Genetic analyses will help us to clarify their status. This is the case for *Arthroleptis* sp. *Astylosternus* cf. *occidentalis*, *Bufo* sp., *Hyperolius* sp., *Ptychadena* sp., *Phrynobatrachus* sp.1 and *Phrynobatrachus* sp.2, the latter one probably being a species new to science. It is characterized by an eyelid cornicle and a ventral pattern differing from all known species. Other species with an eyelid cornicle are forest specialists. The encountered species *Phrynobatrachus* sp.2 therefore might be a relict from times when the Upper Guinean forest block was more extensive.

DISCUSSION

Due to the dry weather conditions and the short time of the survey of the Boké region we were not able to get a complete picture of the diversity of the amphibian and reptile communities. We assume that there must be many more species less active during the dry season that can be observed during the rainy season. Therefore we assume that the calculated species richness is underestimated. The fact that we were able to detect at least 26 amphibian species despite the dry weather conditions might be a hint to a high diversity existing in the Boké region, especially in the Sangaredi area with its mixture of gallery forest, rivers and savanna habitat. There are different species that we didn't

observe although they are very likely to be present within the region, especially savanna and farmbush species of the genus *Afrixalus* and *Kassina.*

Most of the registered amphibian species were related to disturbed forest, farmbush or savanna habitat, which shows a certain degree of habitat degradation and destruction in the Boké area. Especially in the Kamsar region, there were almost no pristine habitats left and the number of existing fresh water habitats was very small. Nevertheless we were able to record some true forest species, e.g *Astylosternus* cf. *occidentalis* and *Phrynobatrachus* sp.2. The latter might be a relict forest amphibian living outside of the actual forest zone that was able to survive in the remaining forest areas. This supports the fact that even very small forest fragments potentially can provide suitable habitats for forest specialist within a degraded landscape and therefore should be protected (Hillers 2003).

To capture a representative picture of the true amphibian and reptile biodiversity existing in the Boké region, more research and survey work is needed during the rainy season when both groups of organisms are much more active.

examples for these habitat requirements might be the species *Ptychadena retropunctata* as well as the possibly endemic forest species *Phrynobatrachus* sp.2.

Taking into account the many different habitat preferences and habitats needed for the different reproductive modes of amphibians, there should be an effort to maintain the most diverse habitats possible. In the district of Sangaredi, the gallery forests represent a very special and unique habitat within the Boké region by forming a very diverse habitat mixture within the savanna habitat. This might be indicate a very high diversity in comparison with other sites under investigation and should be a conservation priority.

In general, more herpetological investigations during the rainy season are highly recommended for the Boké region. This would allow more precise conclusions on the probable impact of human activities. Such research would give a more complete picture of the local species diversity. It could also provide better knowledge of population sizes and species distribution patterns, of which some might be of important conservation concern, especially forest related and endemic species.

CONSERVATION RECOMMENDATIONS

The reptile and amphibian communities of the Boké region are facing different threats like the degradation and destruction of their habitats by bauxite mining, extension of the villages and slash-and-burn agricultural practices of the villagers. Although we only got a rough picture of the biodiversity of the Boké region, we recommend the protection of certain places within the region. Any kind of remaining forests (especially gallery forests) as well as all fresh water habitats within the Boké region should be protected, otherwise there is no place left where amphibians can survive during the dry, and in cases of present forest species, even the rainy season. The most prominent

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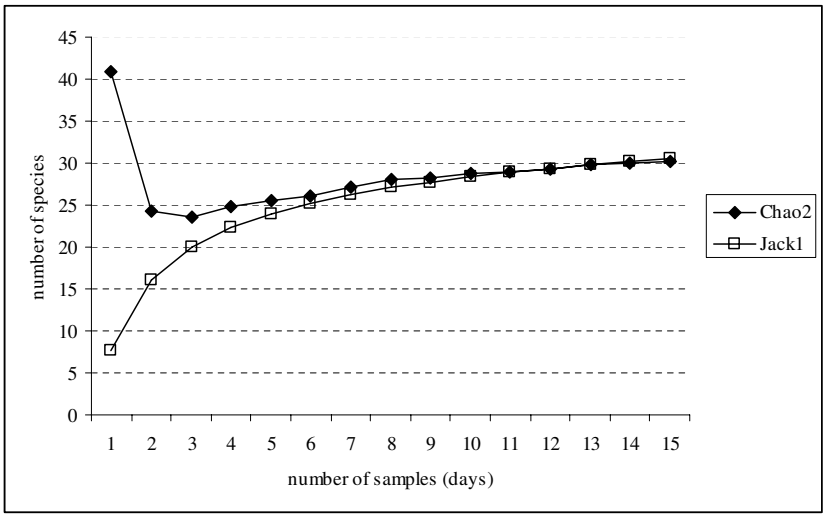

Figure 6.1. Estimated species richness for amphibians of the Boké region, Guinea.

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