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Contribution to the Knowledge of Amphibians of Kponyo village (DR Congo)

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ABSTRACT

Our survey was conducted in the forest habitats and on the border of the river and road. Additional materials were obtained from different traps (Pitfall and Vervet net). In total, 16 frog morphospecies/representatives of species were collected and recorded. Most of the specimens of amphibians were collected in the forest habitats. Two specimens of *Hemisus* were collected in the primary forest.

Key words: Kponyo village, Amphibians, Bio-indicator, Democratic Republic of the Congo

INTRODUCTION

The amphibians in the North of Democratic Republic of the Congo (DRC) are one of the less studied in the world [1, 2], except a few expeditions carried out during the colonial period [3] and some few more recently such as the one of VLIR Biodiversity project. Central Africa, especially the Congo Basin is very rich in plant and animal biodiversity and this one still needs to be explored in order to estimate its lushness and distribution of species. And this situation is also crucial for amphibians as part of terrestrial vertebrates. In general, this part of DRC has two seasons which departs from April to October for the wet season and the dry season between December and February [4, 5].

The lack of road infrastructure and safety issues [6-8] is one of the major problems that make the access difficult to the biodiversity in this part of the country as well as its fauna and flora. However, the biodiversity of herpetofauna of this region is poorly known. Several expeditions need to be carried out in this region in order to explore this lush and probably new species could be identified for the vegetation is still intact with a few open canopies though some anthropic activities can be noticed (e.g. Slash and burn itinerant agriculture). The majority of population of this region is made of hunters. Recently, different surveys were conducted in various parts of the country where no herpetological surveys had been conducted before. In this region, the problem is the lack of specialists in herpetology, and this science had not received a lot of attention from scientists of this region since ages. Thus, an expedition is needed in this part of the country in order to access and explore this biodiversity (flora and fauna) and identifies what are kinds of species are in. Henceforth, the current study targeted the herpetofauna namely amphibians. However, the biodiversity of herpetofauna of this region is poorly known, hence the need of

an intensive investigation i.e. it can host a huge diversity of different species in terms of flora and fauna.

Amphibians are important parts of ecosystems and provide numerous ecosystem services. Their composition may reflect the degree of habit degradation and destruction [9, 10]. They are among the most endangered groups of animals worldwide and the main cause of this decline is associated to the loss and fragmentation of the environment [11-13].

MATERIALS AND METHODS

Specimens and tissue samples were collected during field survey at Kponyo (N03°19.598', E024°01.429', 421 m) a small village in Bas-Uélé Province (DRC). A total of 47 specimens of amphibians were collected during a ten-day survey. Specimens were preserved in 70% ethanol in the field. Amphibian specimens were mainly detected during visual surveys (almost no calling activity) [14], but several specimens were recorded while calling on vegetation [15]. Frogs were found in variety of habitats including ponds and puddles [14] on the border of the road and in the streams (e.g. *Xenopuscf.laevis* and *pygmaeus*). Searching techniques in the field were visual and encounter including investigation of potential hiding places [16, 17]. Color photographs of live frogs' specimens were taken [17] which were used in combination with exterior morphological characters to identify specimens to species level. Tissue samples (Tongue) were preserved in 95% ethanol and were sent to the Royal Institute of Natural Sciences of Belgium (ISNB), and the specimens were preserved in 70% alcohol and they are stored at "Centre de Surveillance de la Biodiversité" at the University of Kisangani. Specimens of *Artholeptis ssp.*, *Hemus ssp.* and the majority of specimens of *Xenopus*, and some *Amietophrynus* were recorded only in the primary forest in the pitfalls installed to collect small mammals.

RESULTS AND DISCUSSION

Sixteen amphibian morphospecies were recorded during the survey carried out at Kponyo (a small village in the north of DRC). So far it is not possible to reliably differentiate

Arthroleptis spp and *Amietophrynus* spp, *Xenopus* and *Leptopelis* based on their morphology. The list of amphibians collected at Kponyo village during the survey is presented in Table 1.

Table 1. List of Amphibians collected at Kponyo village and their microhabitats

Species	Microhabitats					
	Pounds	Water	Vegetation	Puddles	Forest	Village
Arthroleptidae						
<i>Leptopelis cf. christyi</i>			X		X	
<i>Leptopelis cf. brevirostris</i>			X		X	
<i>Leptopelis cf. millsoni</i>			X		X	
<i>Arthroleptis cf. sylvaticus</i>					X	
Bufonidae						
<i>Amietophrynus regularis</i>				X		X
<i>Amietophrynus maculatus</i>						X
<i>Amietophrynus spp</i>					X	
Hemisotiidae						
<i>Hemisus cf. sudanensis</i>					X	
Hoplobatrachidae						
<i>Hoplobatrachus occipitalis</i>	X	X				
Hyperoliidae						
<i>Hyperolius spp</i>			X			
Phrynobatrachidae						
<i>Phrynobatrachus auritus</i>			X			
Ptychadenidae						
<i>Ptychadenachristyi</i>					X	
<i>Ptychadena cf. aequiplicata</i>	X			X		
<i>Ptychadena mascariniensis</i>	X			X		
Ranidae						
<i>Hylarana albolabris</i>					X	
Pipidae						
<i>Xenopus cf. laevis</i>	X	X				
<i>Xenopus cf. pygmaeus</i>	X	X				

ARTHROLEPTIDAE

One specimen of *Arthroleptis cf. sylvaticus* was collected from a pitfall, in the primary forest. Three specimens of *Leptopelis brevirostris* in the forest on the vegetation were collected belonged to *Leptopelis* genus we collected three specimens of (Werner, 1898) on vegetation in the forest. [19] found two specimens of this large tree frog near Ganganya bush in Congo; *Leptopelis cf. christyi* was also found on vegetation in primary forest near the river together with *Leptopelis cf. millsoni*.

BUFONIDAE

Three morphospecies of *Amietophrynus regularis* were collected (Reuss, 1833) near the village and one specimen was obtained in an open field. The *Amietophrynus maculatus* was

captured inside the forest and near puddles at night. Additional specimens were collected by children of this village. One specimen of a complex toad was exclusively found in a pitfall trap in the forest habitat.

HEMISOTIDAE

Three specimens of *Hemisus cf. sudanensis* CSB40; 41 were collected from a pitfall trap settled to capture small mammals in the primary forest, and no species was detected in the fallow or in the secondary forest.

HOPLOBATRACHIDAE

Three specimens of *Hoplobatrachus occipitalis* (Gunther, 1858), CSB37; 38, 24 were collected in pounds and in water. They were collected by hand at night and were easy to be

located by their call and eye shine from a headlamp beam [1]. Some specimens were captured in the deep puddles by net and one specimen was captured in the Kponyo river by vervet net installed to collect fish.

HYPEROLIIDAE

Only two specimens of *Hyperoliussp*CSB43; 44 were collected exclusively on vegetation.

PHRYNOBATRACHIDAE

Several specimens of *Phrynobatrachus auritus* (Boulenger, 1900); CSB09, 10, 11 were collected in the forest habitats at night on the vegetation and by hand near the rivers explored during the survey.

PTYCHADENIDAE

In this family, three morphospecies were collected. *Ptychadenamascariniensis*CSB26 were abundant and very common in the village, the majority of specimens were collected in ponds at night by hand; *Ptychadena cf. aequiplicata*. CSB35 was collected together with *P. mascariniensis* in the puddles at night and were easily located by their call, but this morphospecies was difficult to capture. *Ptychaden achrysty* CSB03 was found exclusively in the forest always on leaves and was easy to capture.

RANIDAE

In this family only one species *Amnirana albolabris* was found (Hallowell, 1856): CSB06; 08; 15. But several specimens were collected and they were found in the forest habitat only.

PIPIDAE

In this family only two morphospecies were collected: *Xenopus cf. laevis* and *Xenopus cf. pygmaeus*. They were captured in water and in a pitfall trap. The species of the *Xenopus* genus are used as pregnancy assay since the early 20th century and as the model organism for research. *Xenopus laevis* is also identified as a potential vector for the amphibian pathogens *Batrachochytrium dendrobatidis* [20].

The figures 1-3 give the photos of some Amphibian species captured at Kponyo village.

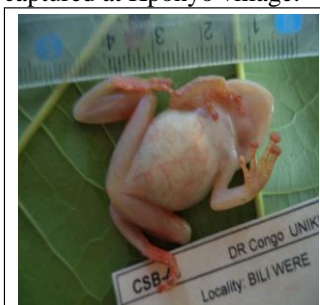


Figure 1a. *Hyperolius sp*



Figure 1b. *Hyperolius sp*



Figure 2a. *Hemisus sp*



Figure 2b. *Hemisus sp*



Figure 3a. *Ptychadena cf aequiplicata*



Figure 3b. *Ptychadena cf aequiplicata*

The survey recorded 16 morphospecies of amphibians. However, the result of the current survey shows that the species lush of Kponyo village is less compared to previous surveys [1, 7, 9, 13, 21-24]. The amphibian investigation in Yoko and Masako reserves listed 18 and 30 species respectively [25]. Another survey carried out in two protected areas of Province Orientale (Tshuapa Lomami Lualaba, Rubi-Télé) and UMA forest revealed that 29 species of amphibians are known in Kisangani ecoregion [26]. Compared to the current survey, it is clear that this area is not rich in amphibian species. However, the current estimation of amphibians in Kponyo village does not reflect the total amphibian fauna of this area because of the lack of knowledge of this fauna. Thus, a long duration intensive investigation is required in increasing the number of habitats and microhabitats in order to describe a number of species of this eco-region [9]. Given that the intact state of the forest with its cover canopy, the probability of identifying a number of species is very high.

Western Africa amphibian diversity is high while many countries of this part have lost many of their natural forests compared to some Congolese forest diversity where natural forests are still intact with a covered canopy. As a matter of fact, the Congolese diversity is so far well known, hence a need of an intensive assessment of its biodiversity precisely in in herpetology.

The main difference between this survey and previous one might be due to the covered nature of the study area and the expectation of getting different large habitats, including more or less intact forest or completely degraded habitats [27]. Frogs were captured in forest habitats during the survey, and additional animals were found in the pitfall trap installed to collect small mammals.

One specimen of *Hoplobatrachus* was captured in the deep water in the Kponyo river by vervet net installed to collect fish. In general, the forest of this region is still intact with its covered canopy (only open field of banana, rice etc), though the region is degraded somewhere due to the search of ores (gold and diamond). Then several holes are seen in the forest and constitute the habitat of *Xenopus* and probably for others species. This is the first record of *Hemisus* in this collection and was captured in a forest habitat (figure 4) inside a pitfall trap. This forest is an ecotone between the savannah and the rain forest. This can justify the presence of *Hemisus* in this region. Only two specimens of *Hyperolius sp.* were captured on vegetation around the village.



Figure 4. Habitat (primary forest) where *Hemisus* sp were captured

CONCLUSION

The aim of this study was to identify amphibians (through a field survey) as bio-indicators of ecosystem integrity. Some frog species were collected and recorded. Most of the specimens of amphibians were collected in the forest habitats. Two specimens of *Hemisus* were collected in the primary forest. It is there necessary that the present study would be extended to other sites in order to evaluate the impact of the human activities on the forest ecosystems of the Democratic Republic of Congo.

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