

# Conservation and assessment of the extinction risk of a threatened new species of endemic freshwater crab *Louisea nkongsamba*, from Mt. Nlonako, Cameroon

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By

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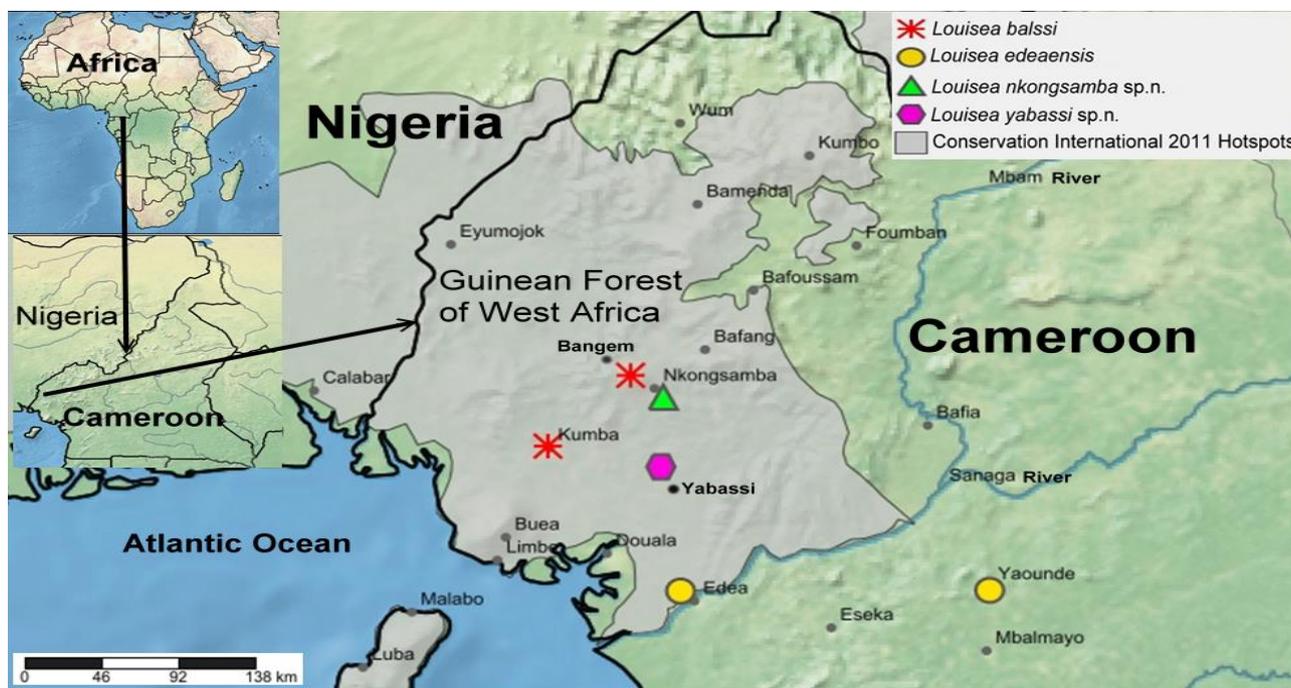
University of Douala

The pilot project supported by the 1<sup>st</sup> and 2<sup>nd</sup> Rufford Small grant foundation in 2015 and 2016 have led to the rediscovery of the endangered and threatened Cameroon endemic freshwater crab species genus *Louisea*, *L. edeaensis*, *L. balssi*, after more than a century of being lost to science (Fig. 1). The pilot project in 2018 supported by the 1<sup>st</sup> Booster Grant made the discovery of the threatened species' *Louisea nkongsamba* from Mt. Nlonako Wildlife Reserve (Littoral Region of Cameroon) that is part of a 1,600 km long chain of volcanoes known as the Cameroon Line (4°49'-4°56'N to 9°56'-10°01'E). This species was newly described based on morphological and molecular data. Our data indicate that the highland dwelling species *L. balssi* is the sister group to the two other species of *Louisea* (*L. edeaensis* and *L. nkongsamba*) found at lower altitudes, which indicates that speciation may have happened along an altitudinal gradient (Fig.2). However, further phylogenetic analyses are needed to establish whether this can lend support to the hypothesis that CVL is a montane centre of speciation (Mvogo Ndongo et al., 2019).

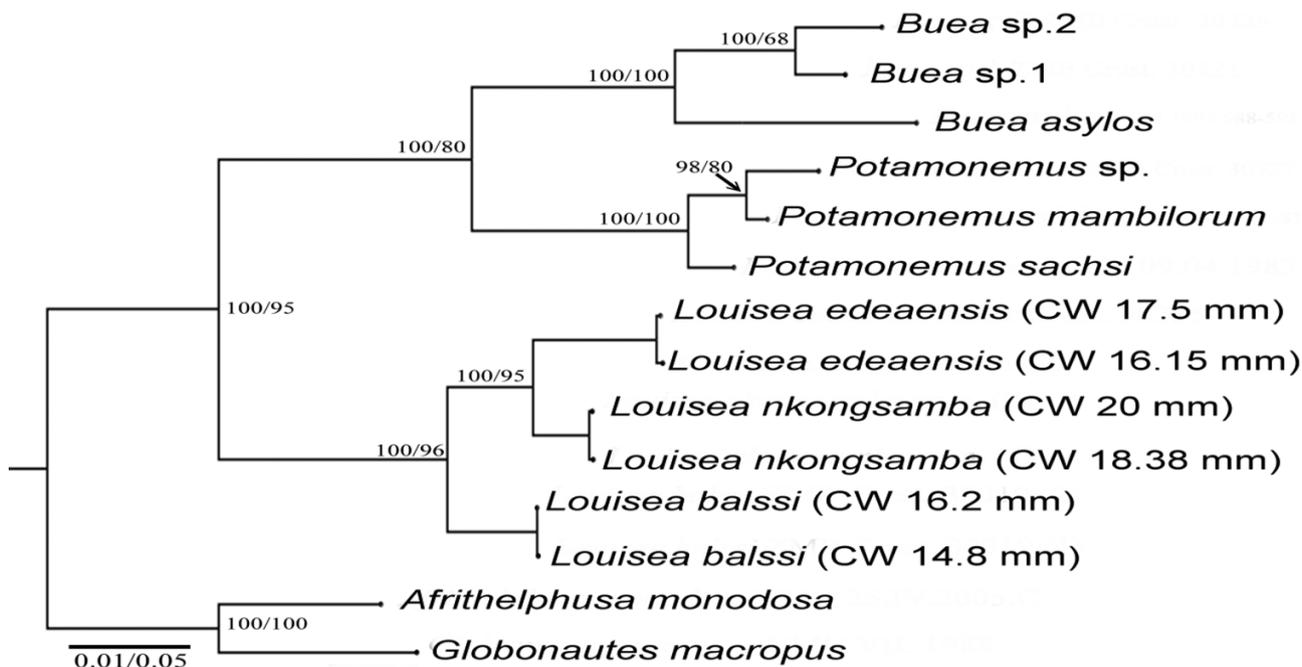
Mt Nlonako ecological reserve encompasses ca.15, 000 hectares with three main slopes: northern, southern and eastern, and the small specimens of *Louisea nkongsamba* was found at each of these slopes. This finding inspired to pursue the conservation effort aimed at protecting. The aim of the project was to collect population levels and trends, distribution, habitat preferences, and threats and MtDNA loci (COI, 12SrRNA, 16SrRNA) to investigate historical connectivity among populations, to implement the future management of genetic diversity. Also was planned the education of the local community aimed at building awareness of the benefits of preserving and managing their aquatic and forest resources to ensure the long-term success of conservation actions.

*Louisea nkongsamba* was pooled with other species of the genus viz. *L. edeaensis* (Bott, 1969) (type species) from Lake Ossa wetland complex (altitudes below 400 m asl) and *L. balssi* (Bott, 1959) from Kumba and Mt. Manengouba (altitudes above 1300 m asl). The following phylogenetic tree (Fig. 2) suggested that the montane regions on the Cameroon Volcanic Line act as centres of speciation, as has

been reported by Zimkus (2009) for puddle frogs from Mt. Oku. The data indicate that the highland dwelling species *L. balssi* is the sister group to the two other species of *Louisea* found at lower altitudes, which indicates that speciation may have happened along an altitudinal gradient (see Mvogo Ndongo *et al.*, 2019). However, further phylogenetic analyses are needed to establish whether this can lend support to the hypothesis that CVL is a montane centre of speciation.



**Figure 1.** Collection localities of the four species of *Louisea* in Cameroon.



**Figure 2.** ML tree topology for the freshwater crab taxa from Cameroon included in this study derived from mtDNA sequences corresponding to three loci (partial 16S rRNA, COI and 12S rRNA genes). BI and ML statistical values (%) on the nodes indicate posterior probabilities and bootstrap support, respectively.

From October 2019 to June 2020 (see Table 1), we have conducted field surveys on behalf of conservation action plan on Mt. Nlonako ecological reserve and small visit in Eboforest ecological zone where we dramatically rediscovered another threatened species, *Louisea yabassi* (Fig. 3). The fieldworks were not carried out in Avril and May 2020 due the global pandemic of corona virus.

**Table 1. Summary of the results of the combined field surveys in southwestern Cameroon**

FIG	Species	Nlonako ecological reserve					Eboforest (New rediscovered of threatened species)	
		October 2019	November 2019	January 2020	February 2020	June 2020	December 2019	March 2020
2	<i>Louisea nkongsamba</i>	x	X	X	X	X		
4	<i>Louisea yabassi</i>						x	x
6	<i>Potamonemus</i> n. sp. 1	X	X	X	X	X		
8	<i>Sudanonautes</i> n. sp. 1	X	x	x				
9	<i>Buea nlonako</i>	X	x	x	x			
10	<i>Sudanonautes africanus</i>	X	X	X	X	X		

Good sizes of populations of *Louisea nkongsamba* were reported from northern, southern and eastern slopes of Mt. Nlonako ecological reserve. The mtDNA analyses to study two main aspects of conservation concern: population genetics (phylogeographic investigations) and identification of species boundaries using the phylogenetic species concept (phylogenetic investigations) will be carried out at the Museum Fur Naturkunde, Berlin Germany. This work is still waiting to the global pandemic of corona virus.



**Figure 3.** The largest male and female specimens of *Louisea yabassi* newly rediscovered after more than 115 years.

The numerous threats to each slope were reported. These threats are mainly from human activities that include deforestation, habitat degradations, and installation of farming (Fig. 3). Consequently, agro-chemicals are released into the environment that affecting eggs, hatchling crabs, and adults of this species



**Fig. 3.** Farm at Nlonako ecological reserve

The educational component was a basic and ongoing activity with local people from Nlonako ecological reserve and this will be included in the upcoming report after the last trip. Furthermore, this work lay the groundwork for doing an assessment of extinction risk of *Louisea nkongsamba*.



**Fig. 4.** Pierre A. Mvogo Ndongo duing the fieldtrip.