

The Rufford Foundation Final Report

Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Waswa Sadic Babyesiza
Project title	"Effects of climate change on Genetic and Species diversity of Amphibians and Reptiles in the Albertine Rift"
RSG reference	20323-1
Reporting period	November 2016 – November 2017
Amount of grant	£4570
Your email address	waswasadic@gmail.com
Date of this report	3 rd October 2017

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Assess the effect of climate change on the Genetic and species diversity of amphibians in the Albertine rift.				While correlating species distribution with elevation, temperature and relative humidity, we are able to postulate how changes in these affects distribution of species, it should be noted that most of the data collected is more of baseline since there is not much data on amphibians and reptiles collected in this area especially with regard to reptiles. Much as DNA data was collected, genetic studies have not been carried out since samples have not been shipped to the Field Museum of Natural History for analyses. And comparisons with previous genetic material from this region. The process is lengthy since some of the species collected are listed under CITES.
Determine amphibian and reptilian species richness and abundance in the different study areas				We captured, observed and recorded various species of amphibians and reptiles and were able to document species richness, diversity and abundance for the different survey locations

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

Political instability

The security threats in the mountains have always been in red alert and following the heated presidential election of 2016, the threats were even higher. We were however given confidence by the Uganda Wildlife Authority that the situation is calm and in any case we would be protected by rangers in case of any eventualities. Our stay in the mountains was cut short because of tribal clashes between government forces and the Rwenzururu kingdom. The clashes started on the 27th November and we were advised to vacate the mountains on the 30th.

Pit fall trapping

Much as planned for pitfall trapping in all our sampling areas, Pitfall trapping became a real challenge in the mountains because of the steep and rocky slopes while the valleys were filled with water running down the slopes. We however invested more time and man hours in Day and Night VES one team walking between 7pm to 12am in the night and between 11am to 2pm during the day. But since we were doing much night surveys than anticipated we ended up burning out our battery supply so fast. This was solved by sending a hand written note down the mountain with the help of local boy.

Communication

Communication was hard up the mountain since cellular reception poor. This meant that written notes had to be sent with the help of the locals down the mountain and vice versa. This also implied that getting supplies up the mountain would take longer so we had to plan ahead of time for any supplies.

Disseminating information

A seminar has long been planned at the College of Natural Science but the series of strikes between staff students and non-teaching staff has derailed the efforts. At one point the university was close for 3 months, and when students got called back the university was running at a crash programme for any other activity to be slotted in. The efforts are still ongoing with plans to make posters. A copy of the report has been delivered at the Uganda Wildlife Authority who will also return the report to Rwenzori mountains national park conservation department.

Fliers will also be sent to Enock, the manager of Rwenzori mountaineering services because he showed keen interest in learning about amphibians and reptiles and in away update information he gives to his clients.

3. Briefly describe the three most important outcomes of your project.

1. Updated species list of amphibians and reptiles in the Albertine rift.

The previous known and published survey of reptiles and amphibians is by Mathias Behangana in the late 1990s and early 2000s, and that study only concentrated on amphibians. The current survey recorded 37 (21 amphibians, 16 reptiles) and 28 (19 amphibians, nine reptiles) amphibians and reptiles for RNP and SNP respectively. The species are listed together with those known from studies in these sites by Mathias Behangana between 2002 and 2003. 15 species of amphibians were reported from previous studies but not in the current study, while three (*Ptychadena anchietae*, *Leptopelis flavomaculatus* and *Xenopus victorianus*) species were not recorded by the surveys of Mathias Behangana between 2002 and 2003. *Hyperolius castaneus* reported in SNP by Behangana (1996), was recorded at 2822 m asl in RNP. Our results suggest that differences in land cover characteristics and gradient have important effects on biodiversity in the study area, suggesting a more frequent exchange of species among heterogeneous habitats in the low lands than in the homogeneous habitats in high elevations.

II. Factors that affect distribution of amphibians and reptiles

It was assumed that environmental variables influence amphibian and reptile community structure. The assumed influence was evaluated using CCA ordination technique testing three constraining variables including elevation, relative humidity and temperature. The best explanatory model for amphibian and reptile community structure included two and three most important gradients for SNP and RNP respectively. The distribution pattern is more even across sites in relation to constraining variables. However, elevation and temperature are the most important constraining variables in structuring species distribution in RNP and SNP respectively. Only two albertine rift endemics were recorded for this study, *Bradypodion xenorhinum* and *Chamaeleo johnstoni*. This could be attributed to the fact that most herps in this region have not been exclusively studied therefore listed as Data Deficient by IUCN. However species such as *Chamaeleo rudis* need to be given a higher conservation category because their area of occupancy and quality of habitat is reducing as a result of climate change effects and continued encroachment on Rwenzori National Park. *Bradypodion xenorhinum* was observed to be very abundant between 1500-2300 m asl much as this is its preferred range (IUCN 2016) it can be argued that most of the forest below has been cleared for farming or heavily disturbed.

III. Effects of climate change on distribution of amphibians and reptiles

One notable effect of climate change is the distribution of species, along a gradient when climatic temperatures change, some species tend to move further up or below (examples), it was observed that species such as *Chamaeleo rudis* with a known limited distribution, it had records below 2000 m asl contrary to the known distribution between 2000-4000 m asl (fig 2). Some species now have more clumped or limited distribution for example the density of *B. xenorhinum* drastically falls below 1500 m asl nevertheless this study has provided more baseline data to be based on for future assessments for the various species. It was also observed that amphibian records were few and sparsely distributed above 2000 m asl.

IV. Elevational distribution of amphibians and reptiles

Only one species of amphibian (*Hyperolius castaneus*) was recorded above 2000 m asl in the sedges or flooded swamps in Kicucu. It is important to note that much as *Hyperolius castaneus* was the only species recorded above 2000 m asl, it was also recorded with low frequency. This could be because at elevations beyond 2000 m amphibian diversity and abundance significantly shifts from widely distributed lowland species to mostly endemic highland species such as *Hyperolius castaneus* (Sinschet *al* 2011). The ongoing changes in climatic conditions could also explain the low frequency of amphibians at high elevations given their specific habitat requirements. More amphibian species were recorded below 1500 m with the peak being in SNP. Lowland habitats are more heterogeneous, thus providing microhabitats for different species. *Anthroleptis adolfiderichi* a

species known to occur in montane regions of eastern Democratic Republic of Congo, Uganda, Rwanda and Burundi with a lower elevation limit of 1780 m asl was recorded in Semliki at 688 m asl. This then confirms the fact that some of the Albertine rift herp species are poorly known and need more detailed studies for proper evaluation by IUCN.

4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).

The study was mostly within protected areas, i.e. Rwenzori National Park and Semliki National Park, with limited access to locals. We however worked with Rwenzori mountaineering services as field assistants. Many showed enthusiasm to study frogs while many shunned away from reptiles especially snakes because of local beliefs and stereotypes. We worked with two research assistants who even though had worked with herps before, we further trained them in field techniques of surveying and identification of herps especially in montane regions.

5. Are there any plans to continue this work?

Sure there are plans to continue with the study as this is the beginning wider studies in this region including areas like Bwindi Impenetrable and Mgahinga, to compare findings from these highlands commonly known as sky islands. Genetics work has also not been done much as the samples were collected so that's also part of the future outputs of this work.

6. How do you plan to share the results of your work with others?

The results have been available to Uganda Wildlife Authority and National Forestry Authority through detailed reports. These organisations can further use such information for the management plans of the different national parks. With information like which environmental or habitat variables are critical for herp presence in a given habitat; conservation of such species becomes practical. Chameleons are major tourist attraction in Rwenzori Mountains National Park, this study has provided information about distribution and occurrence of various hence helping tour guides.

Publications through relevant journals are underway with the help of collaborators such as the curator of reptiles and amphibians at the Field Museum of Natural History, Chicago.

7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?

The RSG was used consecutively along the year of the project. However, the main expenses were made at the beginning of the project. Purchase of field tools and other supplies, clearing of research fees and transportation to the field.

We consider that the money was spent according to what was anticipated in the project. However, ranger expenses increased because of security threats and we were advised to stay with more rangers than planned for even in Semliki this had implications even with the food resources.

8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. 1 £ sterling = 4200 UGX Bank rate

Item	Budgeted for in £	Actual used	Difference	Reason
Camping fee	150	165	15	Included things like camping fee that was not budget for
Local researchers	225	36	-189	Local researchers pay a much less report deposit fee
Permits	38	0	-38	Incorporated in permits clearance
Permits	46	0	-46	Incorporated in permits clearance
Porters	150	262	112	It also included payments for porters to help us carry things up the mountain
Porters	113	143	30	Included payments for porters to carry things down the mountain and car hire
Vehicle hire	173	186	13	Hiring a vehicle from Semliki NP became seemingly harder than anticipated so we had to hire a car from fort portal
	75	75	0	
	32	36	4	These were locally processed at are slightly high fee. I had planned on buying them online but the cost of shipping them to Uganda was even higher
Jars	150	100	-50	Few jars were bought since few specimens were kept as voucher specimens
Headlamps	24	19	-5	Bought two headlamps instead of four and also two hand help lamps so as to scale down on the budget
Specimens	48	36	-12	Bought fewer quantity since we decided to only collect few of the voucher specimens for each specimen
	60	60	0	
Camping equipment	75	95	20	Had to buy more camping equipment like tarps, plates, hire more tents since we were more people in camp than planned for

Printing costs	38	29	-9	We had to scale down the budget for example we printed one copy of the report for both UWA and NFA instead of the three
	180	180	0	
Additional camping	270	317	47	Had more people in camp than initially planned for
	270	293	23	Had more people in camp than initially planned for
	23	48	25	Had more people in camp than initially planned for
Rangers costs	2430	2,505	75	We had more people to pay (Rangers) than initially planned for

9. Looking ahead, what do you feel are the important next steps?

More surveys in other sites within the Albertine Rift such as Bwindi and Mgahinga.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

Yes the RSG logo was used and the Rufford Foundation publicised throughout this work as the only source of funding among colleagues and relevant government bodies.

11. Any other comments?

This was another learning process for me and greatly appreciate Rufford Foundation for the opportunity.

