

The Rufford Small Grants Foundation

Final Report

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

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. 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. 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	Paul Webala
Project title	Monitoring and conservation of straw-coloured fruit bats, <i>Eidolon helvum</i> (Megachiroptera: Pteropodidae) in Kenya
RSG reference	16334-B
Reporting period	December 2014 – December 2015
Amount of grant	£9950
Your email address	paul.webala@gmail.com
Date of this report	17th January 2016

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
Identify, map and protect <i>E. helvum</i> roost sites			√	We have now mapped three key permanent and focal roost sites used almost throughout the year for straw-coloured fruit bats (<i>Eidolon helvum</i>) at three places in Kenya. These are four sub-roosts in Vihiga County, western Kenya; one big roost in the centre of Kisii Town, Kisii County and one city roost in the centre of Mombasa County. Four other transient roosts in Nyeri, Nairobi, Bungoma and Homabay Counties have also been mapped.
Conduct a national census of <i>E. helvum</i> and monitor trends in populations		√		This is a continuous exercise via monthly counts because the population of bat at both fairly permanent and temporary roosts keep fluctuating. Therefore, only long-term counts may provide a clear pattern of population dynamics at the roosts. In addition, seasonal (intra-annual) as well as long-term (inter-annual) patterns of these fluctuations in relation to climate and their annual migrations can only be unravelled through long-term monitoring.
Document habitat and other threats			√	Tree clearance and even mere pruning of roost trees are a major threat to <i>E. helvum</i> , and this threat cuts across all the permanent and temporary roosts across Kenya. Eradication programmes, via chemical poisoning and direct killing of bats, were also evident at almost all the roost sites in Kenya. Further community outreach and public education still clearly needed

				to minimise these threats.
Investigate roost-site selection in <i>E. helvum</i>			√	As revealed in Webala et al. (2014), further sampling at Kisii and Mombasa roost sites confirms that bats select roost sites that a higher density of roost trees and number of branches. Another key factor that may influence roost site selection could be level of persecution, especially that of pruning or felling of roost trees.
Determine the role of <i>E. helvum</i> in forest regeneration via seed dispersal		√		In addition to 31 plant species identified from a previous study whose seeds are potentially dispersed by <i>E. helvum</i> (Webala et al., 2014), further germination experiments and direct observations at active roost sites across Kenya has added 21 more plant species to the list that <i>E. helvum</i> consumes fruits from. Therefore, thus far, <i>E. helvum</i> potentially disperses seeds from at least 52 plant species in Kenya. The list is likely to expand with further sampling owing to seasonal changes in food availability that only long-term studies can reveal
Train communities (through selected volunteers) on aspects of bat ecology and their monitoring			√	Selected volunteers were trained from respective focal roost site areas in Vihiga, Kisii, and Mombasa Countries. The volunteers are change agents and are key for achieving continued population monitoring
Educate communities about bat conservation		√		This was accomplished through workshops in schools and local villages at <i>Eidolon</i> roost site areas. We also organised football and volleyball tournaments where bat conservation messages were delivered. Importantly, Vernacular radio talk shows were organised where the (local) public called in

				and had answers provided to their myriad questions on bats in general and <i>E. helvum</i> in particular.
Explore bat ecotourism using straw-coloured fruit bats (<i>Eidolon helvum</i>) as a flagship species			√	The three key roost sites in Vihiga, Kisii and Mombasa Counties are now linked to tourist circuits in their respective areas. Flyers and other interpretation facilities about bats and their importance were provided to Kenya wildlife Service offices and County Wardens' offices in the three counties to draw tourists to the viewing of large colonies of <i>E. helvum</i> at roost sites and during spectacular evening emergence flights
Livelihood analyses to identify and initiate income generating activities		√		Livelihood analyses were successfully carried out at three key roost sites. However, income generating activities were only successfully established at the Vihiga roost sites because they were located in the villages. The cities of Kisii and Mombasa were problematic because of diverse interests of diverse city communities. Here only environmental communities were mobilised to establish tree nurseries and plant trees
Track a few individuals of <i>E. helvum</i> using GPS trackers to address ecological knowledge gaps and determine movement and possible migration patterns	√			Only one satellite GPS tag was purchased because of the unanticipated cost. These tags are very expensive and therefore I could not afford to buy more than one. The individual tracked moved more than 192 km in three days whilst foraging and between the Kisii and Vihiga roost sites. Clearly more than one GPS tags are required to address spatial ecological knowledge gaps, determine movement patterns and to help elucidate migratory

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

Despite long-standing awareness of the potentially important ecological role of fruit bats, little is known about the ecology of the vast majority of species. Yet, understanding the long-distance movement of fruit bats has direct relevance to studies of population dynamics, ecology, disease emergence, and conservation. We expected to buy three satellite GPS tags for tracking *Eidolon helvum* to understand the species' movement (and migratory) patterns. Satellite tracking, or 'satellite telemetry', involves attaching a special piece of tracking equipment, called a Platform Terminal Transmitter (or PTT) to a bat. The PTT sends a message to a satellite at intervals, say 15 minutes. The messages are then received via the satellite regarding the location of the bat and the locations are plotted onto a map. However, this didn't happen because the total cost of the satellite transmitters can was £3200, as we also had to pay for time spent communicating with the satellites. Consequently, we only tracked only one bat because we could afford only one transmitter.

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

- ii Germination experiments and direct observations at active roost sites across Kenya has thus far recorded 52 plant species to the list that *E. helvum* consumes fruits from. Therefore, thus far, *E. helvum* potentially disperses seeds from at least 52 plant species in Kenya, including economically important and locally available fruit trees such as the common guava, pawpaw, figs, among others! The study's results illustrate that the disappearance, or local extinction, of the bats from the area can have serious deleterious effects in the area because of their role in facilitating seed interchange between different forest patches and the revegetation of large open areas.
- iii Three key/permanent roost sites in Vihiga, Kisii and Mombasa Counties are now linked to tourist circuits in their respective areas. With the marketing of the three roost sites and the straw-coloured fruit bats as tourist sites and species, respectively, more tourists are likely to be attracted to the sites and with them some income will accrue to local counties and communities. This may act as incentives for bat conservation in these counties and beyond.
- iiii A pilot satellite tracking study of *E. helvum* in Kenya. This provides a platform to launch a robust study to a larger number of individuals of this species to elucidate the pattern and magnitude of its apparent nomadic movements. Understanding the movement dynamics of *E. helvum* will inform both its conservation management and the mitigation of any potential disease emergence.
- iiv Volunteers drawn from local communities were trained as "Community Bat Champions" to take leadership roles in local bat education. These local Champions are effective for promoting bat conservation and protecting known roost sites.

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

The local communities were involved in workshops, training (volunteers) and livelihood analyses (including tree planting exercises). They were also part and parcel of organised football and volleyball tournaments where bat conservation messages were delivered. Local communities were an integral part of vernacular radio talk shows where they called in and had answers provided to their myriad questions on bats in general and *E. helvum* in particular.

5. Are there any plans to continue this work?

Yes! We are planning on scaling up some of the activities and initiate some more so as to enhance the long-term conservation of straw-coloured fruit bats in Kenya.

- i. Continue population monitoring and searches for additional *E. helvum* roosting camps in Kenya. Data on population estimates have been collected for a short period of 2 years. Therefore, there is need to collect a full complement of annual and inter-annual data. In light of our findings of monthly fluctuations in population size of straw-coloured fruit bats and shifts in the use of current roosting camps, it is possible that other roosting camps exist in Kenya. Annual data on population trends of bats at all possible roosting camps would be useful for preparing an annual roosting calendar for potential marketing as ecotourism sites as part of Kenya's tourism circuits.
- ii. Public education and community outreach programmes need to be continued and sustained to improve understanding about bats and dispel myths and traditional beliefs harboured by local people across Kenya.
- iii. We intend to track more *E. helvum* individuals to understand their broad-scale movement patterns and explore the potential contributions of the species to ecosystem processes.

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

We plan to hold more seminars with local stakeholders, including amongst the local communities, to specifically demonstrate the link between the straw-coloured fruit bats and forest regeneration in the region. Alongside seminars, colourful brochures will be produced, and we will contribute to local newsletters where general project outputs and outcomes will be highlighted. Presentations will also be made in invited seminars across Kenya. A full report of the 1-year project will be presented to the Kenya Wildlife Service and the National Museums of Kenya. Eventually, with more data, we will publish the work in an international peer-reviewed Journal.

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

The project was conducted in 12 months but activities such as public education and community outreach need to be continued and sustained to change local and public perceptions about bats across the range of *E. helvum* in Kenya

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.

Item	Budgeted Amount	Actual Amount	Difference	Comments
GPS trackers and associated telemetry devises	2500	3200	700	We didn't anticipate the cost of GPS tags to be that expensive. In the end we only managed to buy solar-powered satellite GPS tags from Microwave Telemetry
Tree nursery and planting	1000	500	500	Balance was used top up purchase of a GPS tag
Fuel	2000	1800	200	
Income-generating activities	1500	1550	-50	
Workshops and training	1000	1100	-100	
Batteries	100	100		
Printing	50	50		
Research Scientist	1000	850	150	Used to top up other activities e.g. for workshops and training
Research Assistant	800	800		
TOTAL				The exchange rate used 1.00 GBP = 142.343 KES.

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

Please see section 5 above! We will be applying for a booster grant from the Rufford Foundation and matching funds from the Bat Conservation Grassroots Program to carry out activities indicated in section 5. We hope to continue and sustain public education and community outreach programmes to change local and public perceptions about bats across the range of *E. helvum* in Kenya. Fundamentally, further funding is required to track more *E.*

helvum individuals to understand their broad-scale movement patterns and explore the potential contributions of the species to ecosystem processes. The latter is key in informing the conservation management of the species in areas where they forage, move to and migrate to in Kenya and beyond.

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

RSGF logo was used on the posters and when training project volunteers drawn from the local communities, including on t-shirts that were donated to volunteers, volleyball and football teams. We will also include RSG as the major donor of our activities when we prepare articles for newsletters and publications in the near future.

11. Any other comments?

We are very grateful to RSGF's continued support for this project, the first of its kind on the biology of straw-coloured fruit bats in Kenya.