

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	Jelena Burazerović
Project title	Conserving bats and important habitats in agricultural environment in Serbia
RSG reference	13770-1
Reporting period	August 2013-July 2014
Amount of grant	£5919
Your email address	jelena.burazerovic@gmail.com
Date of this report	27.11.2014

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
Conduct research of habitat associations and importance of different features for bats in agricultural landscape			X	This objective is fully achieved. We have analysed the relationship between six habitat types (arable, water, deciduous and coniferous forest, scrub and water) and the level of activity of all recorded bat species, using GIS tools and statistical methods. The summary of the results which we obtained is that the activity of bats is significantly positively affected by the presence of water and woodland habitats , as well as the edge habitats , and especially by the length of linear features such as the woodland edge and water (river, stream, pond) edge .
Provide data about the distribution and ecology of bat species in south-eastern Europe			X	This objective is fully achieved. We registered total of 11 out of 29 registered Serbian species identified to the species level, and potentially more, as <i>Myotis</i> group of species is very hard to identify to the species level based only on recorded ultrasounds. We covered wide area of lowland farmland in the northern and central part of Serbia: southern slopes of mountain Fruska Gora, Obedska bara wetlands, Zasavica wetlands, wider area of Avala mountain and Lower Danube area – on both sides of Danube river. Data gathered about bat distribution under this project is already available in the form of the scientific abstracts, as well as it will be disseminated to relevant governmental institutions in charge of nature protection in the country.
Creation of recommendations for development of agri-environment measures regarding bat conservation, as part of the National Agri-Environment Programme			X	Based on results of the field work done as part of this project, as well as existing literature data about habitat associations of bat species and effects of agri-environment measures on bat activity, we developed general recommendations about important habitats and features in agricultural landscapes in Serbia, which were presented to relevant governmental institutions, as part of project advocacy activities.
Raising public awareness on bat conservation, their ecological and economic importance			X	This objective is fully achieved. In parallel to field work done, we communicated with local community and farmers about importance of biodiversity conservation in agricultural

and benefits of AEM			landscapes, especially bats. Through conversations, farmers got interested in the aspect of bats being important natural regulators of insects, some of them being recognised as agricultural pests, as well as for the concept of biodiversity being essential for sustainable use of the agricultural lands. It seems that economic aspect is very important and strong motivator for farmers to get involved. We also conducted in cooperation with NGO ORCA workshops for teachers, as an important step for educating local communities, especially children and youth about importance of biodiversity conservation in agricultural landscapes, and what benefits do we as people have from it. Special webpage dedicated to the project and its result has been kindly developed and posted by ORCA at www.orca.rs
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

1. Problem with equipment – we had difficulties at the beginning of field work with rechargeable batteries used with our SM2Bat+ detectors, as they were not fully compatible with the device. The problem was soon solved with acquiring new set of compatible batteries, in accordance to manufacturer’s recommendation and after series of consultations with experienced researchers and equipment manufacturer.

2. Bad weather conditions – as the project started in August 2013, by the end of our working season (late October 2013) there were fewer days with compatible weather conditions for recording sounds of echo locating bats (temperature higher than 10 degrees, low wind speed, no rainfall). However, due to very efficient and intensive field work during August and September 2013, we managed to provide enough replicas per habitat needed for this year of research.

3. Obtaining layers for GIS analysis from the National Geodesy Institute – this was not possible due to the fact that these layers were not finished by the time we needed them for our GIS analysis. Instead we obtained high resolution aerial pictures of the surveyed areas, ground-proved them and digitised the land use around the sampling points, as well as the linear features surrounding them.

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

1. Obtained results of the first habitat association research of bats in agricultural landscapes in Serbia, as the basis for development of agri-environment measures aimed at bat conservation.

This project initiated data gathering directly from the field, verification of findings from literature and research in more developed European countries, and provided concrete and exact data about specific habitat preferences of specific bat species and group of species, as well as effects of different linear features in agricultural landscapes. We used research design that included six habitat types, two ultrasound detectors positioned one at the edge and one at the centre of habitat,

recording simultaneously from the sunset until the sunrise. Field work was conducted in period August-October 2013. Results of this research provides basis for general recommendations for development of agri-environment measures of bat conservation in Serbian agricultural landscapes. It is vital that schemes are tailored to specific habitat characteristic of the country concerned if they are to succeed. Therefore, the timing of conducted research is ideal for the successful implementation of such schemes in Serbia, as there is a policy call for it. The summary of the results which we obtained is that the activity of bats is significantly positively affected by the presence of **water and woodland habitats**, as well as the **edge habitats**, and especially by the **length of linear features such as the woodland edge and water (river, stream, pond) edge**. The most abundant of all species recorded were **pipistrelle species**, as well as the **noctule**. 29.4% of all activity was recorded in water habitats which covered on average only 3% of the analyzed landscape. Especially sensitive to edge effect of habitats were the following species: *Pipistrellus*, *Pipistrellus pygmeus*, *Pipistrellus kuhlii*, and *Barbastella barbastellus*¹.

2. Raised interest of governmental institutions in charge of nature conservation in Serbia. As part of project activities, we organised meetings with representatives of the national Nature Protection Institute and the Provincial Secretariat for Urbanization, Construction and Environmental Protection. After discussing about current situation in nature protection and agriculture from the policy and enforcement perspectives, representatives of these institutions showed interest in development of joint initiatives aimed at biodiversity conservation in agricultural landscapes in Serbia, especially bats, based on results of conducted research under this project.

3. Raised level of awareness of local community and general public about the conservation of bats in agricultural landscapes. Important part of project activities was targeting farmers from local communities where research took place, where through direct conversation with local people, we discussed about the importance of biodiversity conservation, concrete economic benefits which farmers have from it, and roles which bats have in ecosystems. Furthermore, in cooperation with one of the most famous NGOs in Serbia, Organisation for Respect and Care of Animals – ORCA, which runs certified teachers training programme since 2007, we conducted workshops with teachers about bats, their importance in ecosystems and issues in conservation of biodiversity in agricultural landscapes. The benefits of these workshops are in the fact that they present one of the most sustainable ways for increasing knowledge and awareness of many generations of children and youth, and mobilise them for providing active support to nature conservation efforts. ORCA kindly provided space at their website to provide information about the project and bat conservation in Serbia, also linked to the website of the Rufford Foundation. This information is planned to stay permanently on ORCA's website – which is also part of project's sustainability.

Also one of the added values of this project is the fact that ORCA's Board adopted bat research and conservation to become one of its main strategic activities in the following 2015-2020 Strategic Plan.

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

During our field work we have communicated with many people from wider areas of Fruska Gora, Obodska bara, Avala and Lower Danube area region – farmers and people living in rural areas where

¹ Burazerović, J., Tizzani, P., Preacco, N., Čirović, D., Jones, G. (2014) Habitat associations of bats in agricultural landscapes in Serbia. XIII European Bat Research Symposium, Šibenik, Croatia, Book of Abstracts, pp. 48.

research took place. In our discussions we realised that there are many problems they are facing, having in mind difficult financial situation in which Serbia is in. However, most of them were keen to participate and help in performing scientific research once they hear the applied aspect of it, through providing their agricultural land as research fields. Most of them were not aware of the benefits which wildlife have for agro-ecosystems, which is not very strange having in mind that Serbia still does not have national agri-environment policy and its enforced measures. Still, they expressed their readiness to participate in agri-environment schemes if clear benefits for them are presented, and guarantees from the official institutions in charge of its enforcement are given. Furthermore, in cooperation with ORCA we trained 52 elementary and high-school teachers about bat and biodiversity protection in agricultural landscapes and benefits involved, so they can disseminate and transfer this knowledge and information to their students in different local communities in Serbia. Furthermore, ORCA's volunteers and interested students joined our research team and helped us in conduction of our field work, learning at the same time about the methodology for the study of bats, and issues in their conservation, especially in agricultural landscapes.

5. Are there any plans to continue this work?

The fieldwork has been continued in 2014, in order to provide more input data needed for making statistical models more robust (providing more replicas per habitat type). We plan in future to continue our work in agricultural landscapes in Serbia using the equipment obtained under this project, to include more localities from other parts of Serbia, as well as measuring more variables which we can analyse in relation to species presence and level of activity. In cooperation with ORCA and other interested NGOs we will develop future bat conservation projects, as well as we will continue developing joint initiatives aimed at biodiversity conservation in cooperation with relevant governmental institutions, supporting their activities in developing concept of biodiversity conservation in agricultural landscapes.

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

Results of this project has been promoted at local, national and international level

1. We disseminated information at local level through **direct work with farmers** in the countryside, and through **teacher training workshops**. (local level)
2. Project activities and results were promoted and discussed with **relevant national institutions** (national Nature Protection Institute, Provincial Secretariat for Urbanization, Construction and Environmental Protection), who showed open interest in developing project ideas further in joint initiatives aimed at conservation of biodiversity in agricultural landscapes. (national level) This advocacy work shall continue in the future.
3. Project activities and results showing habitat associations were presented in the form of poster presentation, and as an abstract in the Book of Abstracts at **the European Bat Research Symposium in Sibenik, Croatia** 1st-5th September 2014. Another abstract related to importance of different linear features to the level of activities of different bat species, based on research data, was submitted for the Berlin Bat Meeting which will be organised in March 2015 in Berlin, Germany. We also plan to submit a manuscript on these topics to a peer-reviewed journal(s). (international level)
4. Project activities and results are disseminated using ORCA's website, where one **webpage** is specifically dedicated to the project, acknowledging the support of Rufford foundation and

providing further links to Rufford's webpage http://www.orca.rs/wp-dev/sr_RS/sta-radimo/agroekoloske-mere/zastita-slepih-miseva-u-poljoprivrednim-predelima/ (national and international level)

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

The project started as planned in August 2013 and lasted for 12 months as planned. This is in accordance to project proposal timeline.

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
Equipment (SM2Bat+ ultrasound detector, BatSound & Sonochiro sound analysis software's)	1999	1824	-175.	The cost of equipment was less for 175.02 than initially planned.
Fuel costs (field work, promotional activities, participation in teacher workshops)	770	978	+208	Due to bad weather condition and equipment failure, some of the habitats were visited more than once.
Food and accommodation for the field work	2400	2628	+228	At some occasion we had three field workers conducting the field work, and sometimes the accommodation cost was higher than planned.
Production of educational brochure	750	500	-250	We adjusted the cost of design and printing of promotional material to other project costs, having in mind differences between budgeted amount and actual costs.
TOTAL	5919	5924	+111	The actual cost of the project was 10.98GBP higher than initially planned.

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

The most important next steps after conduction of this project are:

- Continue with monitoring of activity of bats in agricultural landscapes in Serbia.
- Focus research on specific bat species.
- Continue advocacy work for conservation of bats in agricultural landscapes and integration of developed recommendations in future agri-environment measures and national agri-environment policy.

- Promote the concept of bats as bio indicators at expert public and state institutions in charge of nature conservation.

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 and promoted at following occasions: in the project educational brochure, at the poster presenting habitat associations of bats in agricultural landscape in Serbia at the European Bat Research Symposium in Croatia (September 2014) and at project webpage at ORCA's website. Rufford support was highly acknowledged at all occasions and meetings with the national nature protection institutions, NGOs, scientists, experts and local communities (teachers, farmers, interested public), as well as publicly through ORCA's website.

11. Any other comments?

We greatly appreciate the cooperation of Dr Paolo Tizzani and Nicole Preacco from the University of Torino (Italy), who performed GIS and statistical analysis of the data, and who are the co-authors of the abstracts presented and submitted at EBRIS 2014 and Berlin Bat Meeting 2015. We owe greatest acknowledgment and appreciation to Professor Gareth Jones from the University of Bristol (UK) who has been continuously providing advice and support during the design of the research, its implementation and analysis of the results. We would also like to express our greatest gratitude to experts providing letter of references to this project proposal: Dr Željko Tomanović, Dr Karen Haysom and Veronika Ferdinandova. And finally we would like to thank Rufford Small Grants Foundation, without whose support to this project our efforts to contribute to bat conservation in Serbian agricultural landscapes would be impossible to be so effectively and efficiently conducted.