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	Ivana Trbojević
Project title	Guardians of the fragile equilibrium in the shallow ecosystems of a Ramsar sites in Serbia: stoneworts diversity and distribution
RSG reference	25789-1
Reporting period	June 2018 – December 2019
Amount of grant	£5 000
Your email address	Ivanatrbojevic@yahoo.com ; itrbojevic@bio.bg.ac.rs
Date of this report	December 2019

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
Start of continuous monitoring program of stoneworts at selected localities and contribution to the more complete diversity observation.				Localities that we selected for starting continuous monitoring are previously known as stonewort habitats. As we assumed, since all available data on stoneworts diversity and distribution in selected localities were single and sporadic findings and no long term, even seasonal data were never obtained, stonewort diversity in these localities was even higher than it was noted by now. We had four new findings for the localities, one new finding for Serbia nad Balkan (actually 3rd locality in Europe – *Chara baueri*) and one possibly new species (*Chara* cf. *connivens*)
DNA material collection				All collected material was herbarised and stored to be suitable for DNA analyses. *Chara* cf. *connivens* material was already processed (DNA barcoding, conducted at Norwegian Institute for Water Research), and the results were remarkable – possibly new species, more similar material should be found and included in analyses so that this could be confirmed. *Chara baueri*, *Chra braunii* and unusual *Nitella mucronata* material is also sent for sequencing, we are still waiting for the results.
Education				We successfully fulfilled this task by attending science fair in elementary school Drinka Pavlović in Belgrade, where we promoted our project and introduced stoneworts and their importance in shallow habitats. One of our main goals is educating our youngest, because they are the ones who is going to inherit the nature from us. Also, public lecture was held in

				terms of project results presentation, for students and Interested parties at Faculty of Biology, University of Belgrade. Public lecture was attended by our students from the biological society Josif Pančić, protected area managers and our colleagues from the Faculty of Biology. We successfully presented our project and introduced our friends, students and colleagues to our future plans and inspired all of them to get involved in nature protection.
Contribution to the stoneworts conservation				In this stage we have planned to promote stoneworts and their important role and to initiate managers as well as local and regional authorities to (at least) start to think on necessity of stoneworts conservation in shallow ecosystems of Ramsar sites in Serbia. Data gathered in this project were used for updating local list of strictly protected wild species in Serbia ("Sl. glasnik RS", no. 5/2010 and 47/2011) – we recommended this list to be widen. Data gathered in this project were fully shared for the purposes of stoneworts distribution updating in new European charophyte monograph (in preparation). Detailed reports on our results after each season were prepared and submitted to the protected area managers and regional and state authorities. Now, when managers are introduced to stoneworts presence in their protected areas and ecosystem services that stoneworts provide in shallow ecosystems, we made room for the next step concerning conservation measures that should take place so that diversity of stoneworts could be preserved in selected Ramsar sites.

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

The unforeseen difficulties arose concerning weather and climatic conditions – which obstructed few field seasons (mainly in terms of floods in June 2019) and

reflected in lower diversity in 2019 in comparison to 2018 season (mainly in terms of habitat dry out in May, when vegetative season for stoneworts should start, and later on in June floods interfered with stonewort oospore germination). Nevertheless, we collected very valuable data in both seasons, and unforeseen difficulties actually enabled us to identify climatic change and instability as threatening factor to stonewort diversity.

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

The three most important outcomes of our project are:

1. ***Chara baueri* discovery in Gornje Podunavlje, Serbia** – this species was considered extinct in Europe until 2009. when it was rediscovered in Germany (Brandenburg, where it was originally described from). This is also among the rarest stoneworts in the world. It is recently only known from Germany and Poland (both localities in 50 km radius), and it has never (in past) been detected southern than Austria. Our finding is most southern finding ever, and the third one in Europe in past 10 years, thus significantly upgrading up to now knowledge on this species ecology and distribution (publication in preparation).
2. Material suitable for DNA extraction and analyses collected in our project revealed that ***Chara* cf. *connives* from Labudovo okno is most probably new species** – for now so called freshwater *Chara connivens* (publication in the 2nd round of review in Botany letters journal, we expect it to be accepted for publication in the next few weeks).
3. **Education and involvement of students and protected area managers**. Elementary school children that attended the science fair where we presented our project are now familiar with stoneworts, what they are, where they live and why they are important for us. In this project period we actively involved biology students in stoneworts research, we had masters student whose research and thesis were supported by our project, and today she is already PhD student, planning to research stoneworts for her thesis. Protected area managers are introduced in stoneworts presence in their nature reserves and some of them are already actively involved in material collection and transfer to us (namely Mihajlo Stanković from Zasavica).

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

Elementary school children were educated on stoneworts existence and importance in shallow ecosystems, thus we at least stimulated generation coming after us to be aware of importance for stoneworts to be protected and preserved in wetlands, so that future of these fragile and above all important habitats is secured.

Students from Faculty of Biology and members of biological society Josif Pančić were introduced to our activities and many expressed interests to join us. Our final results were presented to the group of students and they were impulse to get involved in nature protection more actively.

Protected area managers were educated on stoneworts presence and importance for wetlands balance to be maintained. We introduced them in how to recognise and collect stoneworts and recommended basic measures for stoneworts protection and preservation in their protected areas.

5. Are there any plans to continue this work?

Yes, definitely. After magnificent results obtained in this project period, we are even more motivated to continue stoneworts research and to expand area for field research to shallow ecosystems all over Vojvodina province.

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

We promoted our results at public presentations, and we prepared (or preparing) scientific publications:

1. *Chara baueri* A. Braun in Serbia, first time in Balkans, in preparation (will be submitted to the peer-reviewed journal)
2. Genetic and morphological variation in *Chara contraria* and a taxon morphologically resembling *Chara connivens*, under review, 2nd round, Botany letters (peer-reviewed journal)
3. *Chara canescens* Loiseleur rediscovery in Serbia published in Botanica Serbica, 43 (1): (2019) 97-102 (peer-reviewed journal)
4. Comparative study of oospore morphology in selected Charophyta species, master thesis of Vanja Milovanović, E1008/2018, defended at Faculty of Biology, University of Belgrade in September 2018.
5. Comparative study of oospore morphology in phylogeneticaly closely related species, in preparation (will be submitted to the peer-reviewed journal)

There is also a lot of material for national and international conferences that we are planning to prepare for next year.

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

According to plan, grant was used from June 2018 to December 2019 and the timescale was followed respectfully.

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
Fuel for team and equipment transportation to the selected localities, vehicle service, depreciation and road toll	550	1000	+450	The price of gasoline has increased, and my starting calculations were too optimistic, concerning the fuel consumption and depreciation (I'm not driver myself). Next time, I will know better.
Educational promo material print (selected photography in A4 format, brochure/leaflets 300 copies, posters15 copies, calendars 15, badges 200 copies)	550	1000	+450	Instead of brochure and leaflets, we printed T shirts, notebooks and pencils with Rufford foundation and our project logo. The number of copies for each item was adjusted. Expenses for material design and preparation for print were completely overseen in the initial budget plan. Additional expenses included project logo design, preparation for printing T shirts, preparation for print – calendars, badges, posters, notebooks and pens.
Public lectures for students, protected area managers and local community (interested parties); Photography exhibition, promo material distribution; Organizing (renting equipment and space for presentations, providing refreshment for audience) and travelling expense	500	500		
Daily allowance	1500	750	-750	By sparing the expenses in the field – only 3 people per field trip, and modest refreshment requirements, we managed to

				save the part of money here and compensate higher costs of the first two items.
Laboratory analyses (water chemistry)	1500	1500		
Field transportation service – guide, field car and/or boat	400	250	-150	By sparing the expenses here, we managed to compensate higher costs of the first two items.
Total	**5000**	**5000**		

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

The first important next step in accomplishing our final goal – stonewort conservation in shallow habitats is continuing monitoring that we started in selected Ramsar sites and expansion of area covered with field research to shallow ecosystems all over Vojvodina province. Collecting up to date data on stonewort diversity and distribution and education of protected area managers, rangers and local communities on stoneworts will contribute to conservation of fragile habitats the shallow ecosystems for the fact are. By capturing the real situation in the field, we should gather enough information to address the main threatening factors and propose adequate conservation measures. Our experience makes us convinced that by well-planned and organised field research we can identify more habitats of stoneworts in Vojvodina, even in non-protected areas – thus possibly identifying new places to be proposed for conservation. Results from the project we successfully ended encourage us to persist in our search, and we can probably expand the diversity data even more. Since the vegetative phase of stoneworts is relatively short, and we can't manage to be in many places at the same time (besides water chemistry analyses are very expensive part of our research), as the important step in getting more realistic insight in stoneworts diversity and distribution we see the possibility of sludge collection at the sites of interest (since reproductive structures – oospores are there) and growing stoneworts from it in laboratory conditions. This way we will start to form the first collection of living specimens, suitable for either the experiments or DNA analyses, and at some point, even reintroduction of stoneworts in restoration purposes. Our research should contribute to the update of stonewort threat status and conservation status in Serbia, and the first national guide for stonewort identification. Our first important next step is preparation of the new application for the 2nd Rufford Small Grant.

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

The Rufford Foundation logo was used on promo-material made for the project (t-shirts, calendars, posters, badges, notebooks and ballpoint pens). The Rufford Foundation was also publicised on school fair we attended and public lectures we held. Furthermore, the Rufford Foundation was acknowledged in all publications prepared from the results of the project.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Ivana Trbojević organized (and participated) in all project activities - field trips, laboratory work, promo material preparation and distribution and public lectures. My task was also publishing our results, budget managing and public relations.

Dragana Predojević participated in field trips, promo material distribution and public lectures.

Olga Jakovljević participated in field trips, promo material distribution and public lectures.

Marija Pećić participated in field trips, promo material distribution and public lectures.

Vanja Milovanović participated in field trips, laboratory work, promo material distribution and public lectures.

Gordana Subakov Simić participated in field trips, promo material distribution and public lectures.

Jelena Blaženčić participated in public lectures.

Jasmina Šinžar Sekulić participated in public lectures.

12. Any other comments?

I would like to sincerely thank to the Rufford Foundation for giving me the opportunity to realise my idea and accomplish such amazing results. I have learned a lot during this project period, I am more experienced and better shaped as the project leader and, at the first place more experienced charophytologist.

During the project period, I got pregnant and brought to this world beautiful little girl Vasilisa. When preparing our final presentation of the project results, we used to make fun saying that she is the one of the project deliverables.

I hope that we will continue our collaboration in the 2nd RSG, I will give my best for the next application to be successful, as this one was.

The Rufford Foundation
www.rufford.org

Sincerely yours,

Ивана Арсојевић