

## The Rufford Foundation

### Final Report

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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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
Your name	Roman Cherepanyn
Project title	Status and structure of populations of rare arctic-alpine plant species in highland ecosystems of the Ukrainian Carpathians
RSG reference	19611-1
Reporting period	May 2016 – May 2017
Amount of grant	4956 £
Your email address	roman.cherepanyn@gmail.com
Date of this report	15 May 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
Define and classify type of habitats where rare arctic-alpine plant species are observed.				Rare arctic-alpine species of plants are associated with seven types of habitats in the highland ecosystems of Ukrainian Carpathians: siliceous scree of the montane to snow levels, calcareous and calcschist screes of the montane to alpine levels, alpine and subalpine calcareous grasslands, calcareous fens, active raised bogs, petrifying springs, mineral-rich springs and spring fens.
Determine precise geographic locations of rare arctic-alpine species populations (GPS coordinates) and create map of populations in investigated areas.				We determined precise geographic coordinates using GPS navigators. We made interactive online map with detailed information about geographical location of studied species populations.
To study the characteristic of abiotic conditions of the habitats - soil moisture and pH, temperature of the soil and air.				We defined soil moisture, pH and temperature in habitats of the most rare arctic-alpine species populations: <i>Anemone narcissiflora</i> , <i>Bartsia alpina</i> , <i>Cerastium lanatum</i> , <i>Dryas octopetala</i> , <i>Lloydia serotina</i> , <i>Loiseleuria procumbens</i> , <i>Pedicularis oederi</i> , <i>Salix herbacea</i> , <i>Saussurea alpina</i> . The abiotic conditions in habitats of other rare arctic-alpine species will be investigated in the next expeditions.
Define the conservation status of the species.				We defined the relevant conservation status of researched species in accordance with categories of actual international IUCN classification.
Investigate the structure of rare arctic-alpine species populations.				We defined ontogenesis and number of individuals, determined the age and spatial structures of populations, inter- and intrapopulation variations, viability of populations for some model rare arctic-alpine species:

			<p><i>Alium sibiricum</i>, <i>Anemone narcissiflora</i>, <i>Aster alpinus</i>, <i>Bartsia alpina</i>, <i>Carex pauciflora</i>, <i>Cerastium lanatum</i>, <i>Cerastium cerastoides</i>, <i>Dryas octopetala</i>, <i>Lloydia serotina</i>, <i>Loiseleuria procumbens</i>, <i>Pedicularis oederi</i>, <i>Rhodiola rosea</i>, <i>Salix bicolor</i>, <i>Salix herbacea</i>, <i>Saussurea alpina</i>. The results were published in my book "Arctic-alpine plant species of the Ukrainian Carpathians".</p>
Determine influences of environmental changes and human impact on populations of rare arctic-alpine plant species.			<p>The factors that stimulate or suppress reproduction in populations and their viability were defined for <i>Anemone narcissiflora</i>, <i>Bartsia alpina</i>, <i>Cerastium lanatum</i>, <i>Dryas octopetala</i>, <i>Lloydia serotina</i>, <i>Loiseleuria procumbens</i>, <i>Pedicularis oederi</i>, <i>Salix herbacea</i>, <i>Saussurea alpina</i>.</p>
Investigate seed germination in populations.			<p>High seed germination had been determined for populations of <i>Cerastium lanatum</i> and <i>Loiseleuria procumbens</i>. Revealed that cold stratification and ultraviolet radiation causes increase seeds germination of <i>Dryas octopetala</i> and changes the dynamics of germination <i>Loiseleuria procumbens</i>. Red light spectrum and ultraviolet irradiation have adversely effect on seeds germination of <i>Saussurea alpina</i>.</p>
Give recommendations about the conservation management type on the territory where rare arctic-alpine species populations are observed.			<p>Article "Recommendations for the conservation of some rare arctic-alpine plant species in the Chornohora Mountains (Ukrainian Carpathians)" was published in "Scientific Bulletin of Ukrainian National Forestry University" in the issue № 26.8 in December of 2016 year. Recommendations are also published in my book "Arctic-alpine plant species of the Ukrainian Carpathians".</p>
Organize field summer practice in biology and ecology on the Chornohora massif for students from Vasyl			<p>I organised practice for students of the first and second years of study on the highland biological station "Pozyzevska" of the Institute of Ecology of the Carpathians (National</p>

Stefanyk Precarpathian National University.				Academy of Sciences of Ukraine).
Publishing of the flyers, posters and brochures with popular scientific information about rare arctic-alpine species.				I gathered a lot of materials during the project that was enough for publishing the book. So I decided to write and publish popular scientific book. All resources that were planned for brochures, flyers or posters were used for the preparation and publication of the book. You can download digital version of the book "Arctic-alpine plant species of the Ukrainian Carpathians".
Popularize the project results and distribute popular scientific materials among universities, research institutions, protected areas, non-governmental organization, ecological centers and media.				The popular scientific book was distributed for free to various institutions of Ukraine and Poland. It was distributed among the centres for environmental education for youth; for members of Carpathian Biosphere Reserve; for libraries of Vasyl Stefanyk Precarpathian National University, Ivan Franko National University of Lviv, Wladyslaw Szafer Institute of Botany (Polish Academy of Sciences), etc. I cooperated also with NGOs, for example "European Wilderness Society" and "Carpathian Society".

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

I had some unforeseen difficulties during the project. At first it was planned that expedition will last 60 days during summer and September. But long periods of rains in the Carpathians highlands were not allowed to fully implement planned expeditions. Therefore, field work lasted in general about 40 days.

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

**1. Educational outcomes.** Field practice for students (ecologists and biologists of the first and second years of study) of Vasyl Stefanyk Precarpathian National University was organized on the highland biological station "Pozyzevska" of the Institute of Ecology of the Carpathians NAS of Ukraine in Chornohora massif. Such cooperation between educational and academic institutions helps to deepen the knowledges and skills of students and improve the level of their scientific activities.

**2. Scientific outcomes.** The relevant conservation status of researched species in accordance with categories of actual international IUCN classification was defined. Interactive online map with detailed information about geographical

location (GPS coordinates) of studied species' populations was made. Recommendations for the conservation of rare arctic-alpine plant populations in the Ukrainian Carpathians were published in the Scientific Journal of Ukrainian National Forestry University.

**3. Popular scientific outcomes.** The popular scientific book about arctic-alpine plant species of the Ukrainian Carpathians was published in paper and digital forms that were distributed for free among scientists, activists and institutions. This event had a great positive feedback among colleagues, public and media.

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

Not relevant.

**5. Are there any plans to continue this work?**

1. Analysis of the genetic structure of rare plant species' populations to develop effective measures of their protection requires future research. Such information is especially valuable for small plant populations. Genetic studies can answer questions about geographic and evolutionary processes within species and prospects of existence of rare species.

2. It is important to study other groups of rare plants to understand the adaptation ways of highland ecosystems to environmental changes. Endemic species are suitable for this. Future researches of their populations' structure and status will help to better understand the state of alpine and subalpine ecosystems in the Ukrainian Carpathians and will help to improve nature protection measures in this region.

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

The results of my work are freely available in internet. Article "Recommendations for the conservation of some rare arctic-alpine plant species in the Chornohora Mountains (Ukrainian Carpathians)" was published in "Scientific Bulletin of Ukrainian National Forestry University" in the issue № 26.8 in December of 2016 year.

I will spread the results of my research on lectures at university and at conferences. I will participate in The Second Interdisciplinary Symposium "Biogeography of the Carpathians" that will take place in Cluj-Napoca (Romania), from the 28th to 30th of September 2017 and in The International Conference "Appalachians/Carpathians: Sustainable Development in Mountain Regions: Patterns, Problems, and Prospects" that will be held in Yaremche and Rakhiv (Ukraine) from the 19th to 22th of September 2017.

I will also distribute digital and paper version of the book "Arctic-alpine plant species of the Ukrainian Carpathians" and project results through media resources. The book was already popularized through internet-media of non-governmental organizations

("European Wilderness Society" and "Carpathian Society"). It was also distributed among scientists, eco-activists and various institutions of Ukraine and Poland.

**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 project was implemented as planned during the period from March 2016 to May 2017. Grant was realized in the period from 12th May 2016 until 15th May 2017.

The project had three parts. Detailed studying investigated areas and their geographical features, analysis of the literature about arctic-alpine plant species, planning and preparing to summer expeditions period - all that were the first phase of the project. This phase lasted in spring and consisted from work in libraries and herbarium.

Expeditions in the alpine and subalpine areas of the Ukrainian Carpathians were the second phase of the project. In particular, we carried out field research in Chornohora, Svydovets, Marmarosh and Chyvchyny massifs. This phase was performed in summer and in September.

Analysis and processing obtained data were the third part of our work. It was carried out in office and laboratory conditions. This phase of our project lasted during autumn, winter and spring. I prepared publications, cooperated with NGO and promoted my work results through scientific journal and different institutions during this period.

**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 navigator – Garmin eTrex 30	160	183,8	-23,8	The price of the product was increased in Ukraine.
Photo camera – Olympus TG-4	277	282,3	-5,3	The price was higher because of shipping costs.
Solar Panels – Powertec PTX 1200 USB	123	142,3	-19,3	The price was higher due the devaluation of the Ukrainian currency.
Tent – Salewa Bergen 2	196	184,7	+11,3	I bought other tent (Hannah Rider 2) for our expeditions, because a tent that I noted in the submission of the project application is no longer sold in Ukraine (probably this tent

				(Salewa Bergen 2) is no longer produced).
Soil moisture meter – RIXEN M-700S	185	145,2	+39,8	I bought other soil moisture meter («MF-44») that is produced in Ukraine. Because a soil moisture meter (RIXEN M-700S) that I noted in the submission of the project application has problems during the work and does not show accurate results. Colleagues who used similar devices and laboratory equipment dealers told me about it.
Soil pH and temperature meter – EZODO MP-103S	146	169,3	-23,3	The price of the product (EZODO MP-103S) was 146 £. But its use also requires certain chemical reagents (buffer solutions), that cost 23, 3 £.
Protected mobile phone – Sigma mobile X-treme PQ25	169	204,9	-35,9	The price of the product was increased in Ukraine.
Lenovo ThinkPad T440p	933	638,2	+294,8	I decided to buy cheaper computer for work (Lenovo Thinkpad E560), and the remaining money use for scientific and popular component of the project. Balance was used for the preparation and publishing of the book.
Office costs: printer, paper, booklets, posters, postcards, calendars, brochures	357	1537,4	-1180,4	This position needed more money than planned. All the money was used for the preparation and publication of the book. Work on the processing of photos, design, make-up of the book, copyediting, layout preparation, preparing digital version of the book - all it cost 390,4 £. The cost of printing books (300 copies) is 1147 £.
Travel for investigations	430	650,9	-220,9	More money than planned was used for transport. This was due to several reasons. For some trips to the mountains we



				needed more powerful car, because passenger car was not always suitable for expeditions. I ordered the bus for traveling with students to the highland biological station "Pozyzevska" of the Institute of Ecology of the Carpathians NAS of Ukraine for passing field practice. A lot of trips were also made from Ivano-Frankivsk to Lviv.
Subsistence (3 persons per 60 days, 11 £/day)	1980	842,3	+1137,7	I saved some money that was allocated to subsistence, as the expedition lasted in general about 40 days instead of 60 days. I also managed to reduce money use in one day. Sometimes I worked in the field alone. Balance was used for the preparation and publishing of the book.
<b>Total</b>	<b>4956</b>	<b>4981,3</b>	<b>-25,3</b>	

\*Notes to Budget:

Prices of some products in budget also changed due to differences in exchange rates during the year in Ukraine. For example, there were some periods during the year when the course of pound sterling was 1 £ = 31,0 UAH. But when I applied for the grant the course of pound sterling was 1 £ = 37, 5 UAH. As of today (10 may 2017) the course of pound sterling is 1 £ = 34,0 UAH.

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

The results of our work are the basis to choose the area for realising the future project – identifying of the most suitable permanent research plots for the GLORIA project (Global Observation Research Initiative in Alpine Environments) and its next realisation. Joining of the Ukrainian Carpathians to large international project will help to expand the network of monitoring areas and better understand threats in alpine ecosystems which are under accelerating climate change pressures.

## 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?

I expressed gratitude to RSGF in article which was published in "Scientific Bulletin of Ukrainian National Forestry University". Also the Logo of "The Rufford Foundation" has been placed on prominent position three times in the popular scientific book "Arctic-alpine plant species of the Ukrainian Carpathians" which was published in the "Publishing house of Vasyl Stefanyk Precarpathian National University". For more information see Project Update from April. Also I popularised RSGF among my



colleagues, on the work and on the lectures in university. One of them (Andrii Zamoroka) also won the grant of the Rufford Foundation.

#### **11. Any other comments?**

I want to express my gratitude to The Rufford Foundation. Thank you very much for support the project, for your help in researching and conservation nature in Ukraine and Carpathians and look forward for future cooperation! I also want to express my gratitude to scientific editor (Dr Jurij Nesteruk) and reviewers (Dr Prof Kyyak V. H., Dr Prof Parpan V. I., Dr Prof Tasenkevich L. O.) for their work on the book.