

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. 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	Olga Mochalova
Project title	The research and conservation of rare and threatened plants and important plants areas of Magadan Region (Northern Far East Asia, Russia).
RSG reference	15 July 2010
Reporting period	August 2010 – October 2011
Amount of grant	£ 5600 (exchange app. 44,6 rubl.- 47,2 rubl.)
Your email address	mochalova.om@gmail.com
Date of this report	20 October 2011

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
Complex investigation and protection of endemic threatened plants and its habitats in Northern Far East Asia.				
The data organization of the biology and distribution of rarest restricted ranged endemic species of plants			+	We researched the distribution, ecology, some peculiarity of biomorphology, viability of these plants (Khoreva, 2011; Mochalova, Andrijanova, 2011, etc.). We described by typical methods the no fewer than sampling areas for each species of plat with more details. We determined the seed productions and began to study the regeneration ability (in the 2-3-year normal test period cycle).
The revealing of the important endemic plant areas for conservation of rare plants, start long-time monitoring		+		We allocated and described the five model plots for monitoring investigations of three species (<i>Minuartia tricostata</i> , <i>Pulsatilla magadanensis</i> , <i>Leontopodium stellatum</i>). The all seasons (incl. automatically temperature registration) conducted on the tree plots. We could not reveal the model plots for two rare species (<i>Magadania olaensis</i> , <i>Draba magadanensis</i>) on account of their difficult access. We only enclosed the sampling area for periodic inspection.
The mapping and description the main populations of plants, estimate the quantity and conditions.			+	We were mapping the area of five threatened species in the field by GPS. Then we prepared digital maps of areas of each species and calculated their total area
The creation practical recommendations for the protection of rare plants and their important area.		+		The biological descriptions for each species were made (as typical articles for Red Data List and Biological Flora. The notes of <i>Minuartia tricostata</i> , <i>Pulsatilla magadanensis</i> are being published now. The notes of other species are in redaction. We prepared the report to Russian office of WWF (conjointly with ornithologist) about the Important

				Plants (and Birds) Area that are in need of preservation, and the rare plants which are necessary to include as protected plants.
Communicatory and popularization activities				
The organization of the photo-exhibition, prepare slideshow presentations, and make a television broadcast			+	We made more than 50 large photos of rare and endemic plants with small story for the Ecology Center for Teenagers (Local NGO). We had cinematographer of the local "Caribou-TV" to create 2 programs about our rare and wild ornamental plants.
The publication the illustrated booklet.			+	We published the illustrated booklet "Endemic plants of the Magadan Region" with common biological information about of endemic species. We decided to write about more than 5 endemic plants, inhabiting the northern coast of the Sea of Okhotsk. This booklet was presented to the Ecology Center and several schools in Magadan. Some booklets we present to tourists and travellers in the recreation areas, where rare plants are distributed

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

1. We have been working on the project for fourteen months and have acquired new biological and ecological data on threatened species. Some recognize field materials we already had. One year is too short of a time period to study and monitor plants populations, so we anticipate further research.
2. Poor climatic conditions in the summer of 2011 –including many rainy and foggy cold days— hindered seed production and plant development. Therefore, our data on plant regeneration, especially concerning *Magadania* and *Leontopodium*, is only preliminary.
3. We published an illustrated booklet entitled "Endemic plants of the Magadan Region" (300 copies). Originally, we only planned to describe five of the rarest endemic species in this booklet. But later we decided to write about more than five endemic plants, inhabiting the northern coast of the Sea of Okhotsk. This booklet was presented to the Ecology Center for Teenagers (Local NGO) and several schools in Magadan. Some booklets we presented to tourists and travellers as well. We were surprised by the popularity and interest in the booklet. Many requests have been made to publish and disperse on a larger scale a similar booklet on other rare plants.

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

1. Prepare digital maps for five endemic species with very restricted area.

First of all, we began mapping the area of five threatened species in the field by GPS. The methods of interpreted satellite photographs are not suitable because stony ridges and slopes are widely presented, but random contain the species under discussion.

The GIS maps of these plants (GoogleEarth, ArcView,) reveal that the area where this species occurs is from 1 sq. km to 90 sq. km (Table 1, Fig. 1, 2, 4). The small plant populations are distributed sporadically, occasionally, nonuniform, covering from several sq. meters to hundred sq. meters. The least total area has *Minuartia tricostata* - 1 sq. km (Fig.2), the largest - *Magadania olaensis* – app. 90 sq. km.



Fig.1 The area of Pulsatilla magadanensis. Fig.2. The area of Minuartia tricostata, result of the GPS-mapping.

These five species growing in very few sites of very restricted area ranging from 1 to 90 sq. km. They are not found in the world beyond the boundaries of these habitats. In our opinion, their habitats extremely needed to be protected.

There are small area (app. 40 sq. km.) in the Magadan surroundings (upper stream of Oksa River and Medvezka River), where 3 species (*Minuartia tricostata*, *Pulsatilla magadanensis*, *Draba magadanensis*) occur sporadically in different (not the same) habitats. We described this area as one of the main objects to organize the local protection area (“zakaznik” – local reserve) in the report to Russian office of WWF, prepared conjointly with the Magadan ornithologists (“The main Plants and Birds Areas in the Magadan Region”).

Table 1. The areas of endemic plants.

Species	Species, Latin name	The total area, sq. km.*	The absolute area, sq. km.** and occurrence
Sandwort	<i>Minuartia tricostata</i>	1 + 0.1	0,3-0,4; infrequent and occasional
<i>Draba</i>	<i>Draba magadanensis</i>	36	2-2,5; occasional
Edelweiss	<i>Leontopodium stellatum</i>	38	9; infrequent
Pasqueflower	<i>Pulsatilla magadanensis</i>	47 + 1	2-2,5; infrequent
<i>Magadania</i>	<i>Magadania olaensis</i>	~90+ 0.5 + 0.5	21; infrequent

* The total area shows outline of all edge locations. If one location is isolated from others more than 100 km, plus is given.

** The absolute area is sum of the small plant populations contours.

2. The estimation of viability populations of the rare plants, the classification of these plants to JUCN.

The major part our project was a complex investigation of the biology, ecology, and of population numbers of five rare endemic vascular plants. We collected data on the geomorphology and vegetation cover of habitats, as well as on the morphology, ecology and viability of these plants (Fig. 3) The data were collected at several sampling areas and at whole species ranges. We also studied seed production and stump planting of these plants, collected seeds for experimental research on germination and possibility of their conservation and cultivation. We published the results of this study in peer-reviewed papers and gave presentations at scientific conferences (Khoreva, 2011; Mochalova, Andrijanova, 2011, Khoreva, Andrijanova, in press).



Fig. 3. The map of Northern Far East of Asia. Study regions are shown in red.

Here we are describing the already known factors that explain limited distribution of the five endemic species subjects of our study.

The distribution of three endemic plants, *Minuartia tricostata*, *Pulsatilla magadanensis* and *Draba magadanensis* is influenced by the microclimate conditions and (or) bedrock type. The distribution of these species is clearly limited by the short vegetation seasons and long winters. At the same time, they grow in the most extreme conditions characterized by strong winds and absence of snow cover. The temperature on the sites has been registered by the *iButton Data Loggers* since January

2011 until present (it is our know-how concerning plant ecology in our region). At habitats of Sandwort (*Minuartia tricostata*) temperature ranges from -32°C in January to $+37^{\circ}\text{C}$ in August, at habitats of Pasqueflower (*Pulsatilla magadanensis*) it varied from -30°C in January to $+42^{\circ}\text{C}$ in July. In the adjacent sampling sites the climatic conditions were milder: the temperature ranged from -29°C to $+31^{\circ}\text{C}$.

These species prefer fine-scrub habitats at moderate-altitudes, often with cliffs, found either at watershed divides or on southern slopes (S, SE, SW exposure). At these locations the snow is easily blown away and disappears early and therefore, temperature strongly fluctuates (from $+4^{\circ}\text{C}$ to -24°C) in springtime, from March to April.

Apparently, the speciation events were promoted in case of these endemics (relict, "well", distinct species) by the extreme climatic conditions of the habitats. The bedrock composition also played a role in isolating the ancestral populations, but this fact has not yet been studied.

As result of our investigation we classified these species as belonging to category 3a of the (classification of Red Data List of Russian Federation): rare species, endemic of Russia, northern coast of the Sea of Okhotsk, with relict restrict area. It is similar to category VULNERABLE (VU) (classification of IUCN, Red List Categories): taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future

Only one species from Magadan Region, *Magadania olaensis*, is included into the Red Data List of the Russian Federation. It is an endemic species and genus from the family *Apiaceae*. Our study was not conclusive on environmental factors explaining the distribution of this species. *Magadania olaensis* is widely distributed on the area of approximately 90 sq.km. on the Olskoe Plateau of the Okhotian-Kolyma watershed. The vegetation cover and microclimate conditions of the habitats of this species are diverse. They vary from the dwarf alder shrub stands on slopes and near watercourses to alpine and herb meadows on slopes, to the dwarf shrub and wet dwarf shrub-herb mountain tundra. The altitude of the habitats ranged from 700 m to 1500 m a.s.l.

Two isolated populations of *Magadania olaensis* were found on the Okhotsk Sea Coast. One of them was on the Zaviyalova Island and another was on the Atargan Cape, which are situated at the distance of more than 250 km from the Olskoe Plateau. These populations were found in alpine habitats and in sea-slope grass meadows. At present it is difficult to explain such a disjunction of the species range. The populations of *Magadania olaensis* appeared healthy and did not cause any concerns for their survival. This species was classified in Red Data List of Russian Federation as belonging to category 3 - rare species, endemic of Russia.

The endemic species of Edelweis (*Leontopodium stellatum*) is grows in the meadows and grassy slopes of the Tauysk Bay. The morphology of this species varied considerably among habitats. Examination of the herbarium specimens of closely related species from Kamtschatka (*Leontopodium kamtschaticum*) and upper Kolyma Basin (*Leontopodium palibianum*) revealed high similarity among them. Future investigations of this species complex using both morphological and molecular data are likely to lead to a revision of species boundaries.

Our investigation showed that at present the anthropogenic influence on habitats of all studied species is minimal and is not a factor limiting their distribution. All habitats of these endemic plants

are seldom visited by people due to their remoteness. The only potential, but very serious threat may be the habitat destruction by the mining and road construction companies.

3. The distribution of the illustrated and popular scientific information of the rare endemic plants for a wide audience.

The primary results were the distribution of the illustrated and popular scientific information for a wide audience. For the first time, we acquainted the local population, teenagers, tourists and hunters about the rare plants found in the Magadan vicinity. There was an increase in public participation for the preservation of rare plants and their habitats. The popularity and interest of our booklet demonstrated the need and desire for more information about rare and ornamental plants.



Fig.4 The area of *Minuartia tricostata*.

We wish to note an unexpected incident with the discovery of Sandwort (*Minuartia tricostata*). We heard an unverified story from several fishermen that saw a plant similar to small Pasqueflower with white flowers. Based on photographs of landscape and local descriptions of the plants, it is our hypothesis that these are the *Pulsatilla magadanensis* in the Scheltinga bay, which are difficult to visit due to remoteness.

We organized the expedition to this area. It is a uniquely place for flora and vegetation. We made many floristic findings of the region, including seven endemic plants. For example, we found the western boundary of *Corydalis magadanica*. Surprisingly, on the top of the mountain instead of Pasqueflower we found a most rare species in this area - *Minuartia tricostata*. This population is located more than 140 km from the main range ("locus classicus"), the square is 0.1 sq. km (Fig. 4).

Pasqueflower was also found, but it was atypically small form of *Pulsatilla ajanensis*, also rare but not an endemic species.

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

We worked with teenagers and tourists for the first time. In Magadan, there is only one ecology and biology organization for teenagers. We contacted the Ecology Center seven years ago, when we were studying the relict isolated "Sprice Island" and organized photo-exhibition about this unique forest, which is part of the Magadan Nature Reserve. This NGO (The Ecology Center) has frequently requested a renewal of cooperation and the organization of a photo-exhibition of wild nature and about species from regional Red Data List. We made more than 50 large photos of rare and endemic plants, plants from Red Data List with a short description and helped with the opening of an exhibition. Lectures and studies of the Ecology Center were not only for the members of the Center, but using our booklets, the Center conducted informal classes for school children from various schools.

We organized two excursions for students (biologist and geographer) from the Madadan Northern University to the areas of rare and endemic plants. We told about flora and vegetation of the south part of Magadan Region and about rare and protected vascular plants.

The activist of adventure tourism showed interest in our work with rare plants from the surroundings of Magadan after a television broadcast and presentation of the booklet. Several tourists were given new information about the distribution of rare plants. Many requests have been made to publish and disperse on a larger scale a similar booklet on other rare plants.

During our field seasons we had many contacts with locals, hunters and tourists. We talked with them about the problem of protecting rare and ornamental plants in surrounding area of Magadan, local villages, and in Northern Far East as a whole.

Unfortunately, the Governmental Department of Nature Resource has not shown any interest in our reports about of area of threatened species, nor on the urgent need of their protection. We hope that our information will interest them when the new edition of Red Data List will be in the works.

5. Are there any plans to continue this work?

We are going to continue as conditions allow the investigation of the sampling areas and model plots to estimate the populations' conditions and viability of rarest restricted ranged endemic species of plants. We left for two years the automatic temperature registration loggers iBDL, started in the beginning of our work to collect the data of environmental conditions. This scientific investigation we plan to realize simultaneously with our main botanical field works.

We would like to strengthen our communication activities and the dissemination of our information. We are planning to increase the list of plants of interest - rare protected on the regional level plants from surroundings of Magadan. We want to prepare and publish several booklets, picture postcard and calendar about the rare plants for tourists and teenagers, and to organize new photo-exhibitions. However, these projects require more funding and support.

We are planning to increase our list of studied species of plants which are protected at the local level (from Red Data List of the Magadan District). Already we understand the necessity of investigations of several protected rare plants (*Cypripedium guttatum*, *Goodyera repens*, *Caragana jubata*, *Magadania victoris*) and not included in Red Data List species: *Lysiella oligantha*, *Astragalus ochotensis*, *Corydalis magadanica*, *Hammarbya paludosa* and others.

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

Some scientific results we published in peer-reviewed papers and gave presentations at scientific conferences (Mochalova, Andrijanova, 2011, Khoreva, 2011; Mochalova, in press). We created the typical description (nomination) of the two rare and threatened species *Minuartia tricostata*, *Pulsatilla magadanensis* (in press, in "Biology vascular plants of the Russian Far East", Vladivostok 2011-2012). The peculiarity of ecology and biology of *Magadania olaensis* (species included in Red Data List of Russia) we plan to presentation in scientific press after data processing. We are going to prepare the manuscript "The research and conservation of the endemic threatened plants of Magadan Region (Northern Far East Asia, Russia)" for the "Oryx".

Publications

M. Khoreva, E. Andrijanova *Minuartia tricostata* Khokhr. //Biology vascular plants of the Russian Far East. Vladivostok, 2012, in press (in Russian) Хорева М.Г., Андриянова Е.А. *Минуарция трехреберная – Minuartia tricostata* Khokhr. // Биология сосудистых растений российского Дальнего Востока. Владивосток. 2012 (в печати).

O. Mochalova on the finding of *Minuartia tricostata* Khokhr. on the Peninsula Chmitevskogo (south-west of the Magadan Region) //Vestnik North-East Scientific Center, Magadan, 2012, in press (in Russian) Мочалова О.А. *О новом местонахождении минуарции трехреберной (Minuartia tricostata Khokhr.) на полуострове Хмитевского (юго-запад Магаданской области)* // // Вестник Северо-Восточного научного центра ДВО РАН. 2012 (в печати).

Conference participation

O. Mochalova E. Andrijanova *Pulsatilla magadanensis* in the south part of the Magadan Region // Flora and vegetation Siberia and Far East. Five Russian Conferences in memory L.M. Cherepnina. Krasnojarsk, 2011, V. 1 P. 382-388 (in Russian) Мочалова О.А., Андриянова Е.А. *Прострел магаданский (Pulsatilla magadanensis) на юге Магаданской области.* // Флора и растительность Сибири и Дальнего Востока. Чтения памяти Л.М. Черепнина: материалы Пятой Всероссийской конференции с международным участием: в 2 т. Красноярск, 2011. Т. 1. С. 382-388.

M. Khoreva The biology and ecology of *Minuartia tricostata* // The protection of biodiversity Kamtchatka and adjacent sea. XII International Conference, Petropavlovsk-Kamtchatskiy, 2011, December (in Russian) Хорева М.Г. *Биология и распространение минуарции трехреберной // Сохранение биоразнообразия Камчатки и прилегающих морей: Материалы XII международной научной конференции, Петропавловск-Камчатский, 2011.*

We detect the area in the Magadan surroundings (~ 40 sq. km., upper stream of Oksa River and Medvezka River), where 3 species (*Minuartia tricostata*, *Pulsatilla magadanensis*, *Draba*

magadanensis) are growing together, but not the same habitats as Important Plants Area. We described this area as one of the main object to organize the local protection area (“zakaznik” – local reserve) in the report to Russian office of WWF, prepared conjointly with the Magadan ornithologists in 2011 (“The main Plants and Birds Areas in the Magadan Region”).

The result of our investigations will plan in the new edition of regional Red Data List and give to the editors Russian Red Data List.

In October 2010 and May 2011 Olga Mochalova and Maria Khoreva have participated in regular TV program "Berega Ockotskogo Morja (The Okhotsk Sea Coast) on the local TV in Magadan. We were speaking about our research and protection of the rare plants near Magadan and Roman Balan offered a commentary.

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

The timescale of our work on our project did not deviate from what we planned. We worked in the field on this project for 20 days in August –September 2010 and 6 weeks from April to September 2011. (The research work was conducted between two to five days with short intervals in between). Several model plots we were examined every month during all period of works (August 2010 - September 2011). Several field observations continue to this day.

Our communication activities with locals, tourists, and laboratory scientific continued as necessary. We conducted our popularization activities from November to December 2010 and in February-April 2011 when we prepared a photo-exhibition, presentation and booklets. It took approximately a half of day of work per week.

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.

In general, we spent less money from budget of project for the field and travel expenses.

*However, we had some problems with the rent motor boats in Scheltinga Bay and Tauyskaya Bay on the field works. The rent cost was too high for the time we needed the boats, so we purchased a new boat but used our own motor. So, we used as main part of “Travel expenses”, “Contingency” and “Project management costs”, as money saved from the budget item to cover this difference.

** Accommodation during field research. There were 2-5 persons in the field works at a time, worked in the field by this project during 20 days in August –September 2010 and 6 weeks from April to September 2011 (the research work was conducted between two to five day with short intervals in between). Several model plots we were examined every month during all period of works (August 2010 - September 2011). Half of this work we keep at the same time with other field botanical investigation in the Institute of Biological Problems of North. Therefore, field accommodation was combined with other activities and cost reduced.

Item	Budgeted Amount	Actual Amount	Difference£	Comments
Travel expenses	£ 600	£ 210	+390	*see above
rent off-road truck		190		1 side trip to the Olskoe Plateau in June
bus ticket		20		Many short trips in vicinity of Magadan
Field expenses	£ 2100	£ 2115	-15	
fuel and motor oil	1600	1850		Fiel: 1l ~£ 0.66-0.74 Total 2370l ~£1740 2T oil: 1l ~£ 4.5, £110)
camp gas, petty field equipment	500	220		backpack, waterproof and camping equipment
camping tent		25		Tent Alexica-Lotos-5
repair kits		20		
Accommodation during field research	£ 500	£ 276/ (£ 560)	+224	**£ 3 per day: 2-5 persons for 20-70 day
Consumables and stationery	£460	£ 174	+286	
scientific literature		27		NC
batteries charge, batteries		32		NC
flashcard, CD,		30		NC
Paper and cartridges for printer		45		NC
field markers, zip-lock, rope, etc.		30		NC
Silica gel		10		For molecular data
Equipment	£ 950	£ 2388	-1438	
rubber boat		1510		Brig-420HD *see above
soil pH – tester		64		Kelway HD-1
water pH-tester		38		Hanna HI-98127
iBDL (16 pcs.)		630		The automatic sensor (logger) for temperature measurement, 16 pcs x £ 39.4
iBDL –Flash		146		Data accessing from loggers, 1 pc.
Printing booklets	£ 450	£ 402	+48	
printing booklets		187		300 copies
printing photo		158		47 pcs (30x40), 10 pcs (40x60)
photo frame		57		NC
Post and communication costs	£ 0	£ 23	-23	Post package of herbarium specimens and education materials
Contingency	£ 150	£ 12	+138	Freight, ferry to Yana River

Project management costs	£ 390	£ 0	+390	Admin costs 0
TOTAL	£ 5600	£ 5600	0	

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

There are three important next steps that we hope to achieve in the following year. To increase the list of rare plants, which study with more details and with estimate of population conduction.

To replicate our work in a new region in Northern Far East Asia: Kamtchatka, Commander Islands, West of Saha-Yakutya. These regions with insufficiently investigated flora, especially endemic and relict plants. To organize the sampling areas for monitor of rare plants in other regions.

To print more information about rare and protected plants. To organize the education seminar for teacher and lectors' extracurricular activities. To organize more public events connected with plants.

We are looking forward to continuing this project, which is an actual issue for us.

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?

We used the RSGF logo in the booklet and on the photo-exhibition (The research and printing supposed by the project of Rufford Small Grants Foundation).

We noted the financial support of Rufford Fund in the acknowledgement section at the end of all our articles and publications.

11. Any other comments?

We are extremely grateful for Rufford Small Grant that has funded our projects, and we hope to receive more supports for the research and conservation of rare threatened plants in the Northern Far East Asia.

Appendix 1: photographs of endemic species



Leontopodium stellatum Khokhr.



Draba magadanensis Berkutenko et Khokhr.



Pulsatilla magadanensis Khokhr. et Worosch.



Minuartia tricostata Khokhr.



Magadania olaënsis (Gorovoi et N. S. Pavlova) M. Pimen. et Lavrova

Appendix: photographs from the field



The field camp at the Olskoe Plateau in 14 June 2011. (Photo S.Schvedov)



O. Mochalova and M. Khoreva describe the sampling area Pasqueflower, August, 2010 (Photo V. Kurochkin)



The off-road transport to Olskoe Plateau, June, 12 (Photo O. Mochalova)



S. Shvedov after crossing the river on the coast of the Scheltinga Bay, July 2011 (Photo E. Andrijanova)



The trip with camera-man R. Balan to the area of Edelweiss on the Ostrovnoy Cape in April, 2011 (Photo O. Mochalova)



The talk with local people about plants of region, September, 2011 (Photo O. Mochalova)



The excursion for students from the Madadansky Northern University to the watershed of Oksa and Medvezka Rivers, July, 2011 (Photo M. Khoreva)



M. Khoreva and N. Sazanova pick out the photo to the exhibition in the Ecology Center for Teenagers. (Photo O. Mochalova)