

## 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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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#### Grant Recipient Details

<b>Your name</b>	Erna Karalija
<b>Project title</b>	Distribution and populations assessment of endemic taxa from genus <i>Knautia</i> of Sarajevo's region as a basis for conservation strategies
<b>RSG reference</b>	15899-2
<b>Reporting period</b>	November 2014- November 2015
<b>Amount of grant</b>	£4997
<b>Your email address</b>	erna.karalija@gmail.com
<b>Date of this report</b>	01.11. 2015

**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
Field research			x	All planned field trips were conducted according to the plan.
Plant collection		x		Some of the localities were under drought stress and plants were not collected.
Data collection			x	GIS mapping and GPS coordinates were recorded, maps were made and were compared to the literature data was made.
Capacity building and education			x	Several field investigation was conducted with students, collaboration with NGO Bio.Log was established.
Conservation activities			x	In collaboration with students (seeds were collected for the seed bank), <i>Knautia</i> population assessment.
Social media promotion			x	Promotion through twitter, Instagram and Facebook group Contest for the best photo in collaboration with Faculty of Forestry and NGO Bio.Log.

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

During field investigation on some localities around Sarajevo due to the drought, plants were dried out, or with sunburns and it was not possible to correctly assess the population dynamics or properly identify plants.

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

1. General assessment of population status of *Knautia* species regarding endangerment level and population distribution.
2. Social promotion induced large interest in students and stimulated their enrolment in seed collecting through field investigations.
3. Through best photo contents for Fascination of Plants day students were stimulated to apply best photo for the contest, and they conducted field research on their own.

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

Bio.Log was the NGO who largely participated in conduction of this research, and they also promoted conservation of *Knautia* species through their other activities. During their activities with children (15 years old) their promoted also conservation of endangered species and educated

children not to destroy natural populations. Students of Faculty of Science and Faculty of Forestry had the opportunity to conduct parts of the field studies on their own and to learn how to plan the field study as well how to recognize anthropogenic influences on plant populations. Collaborative workshop with NGOs was also conducted and included Bio.Log and DSB, a large portion of students included in workshop showed interest in continuation of their field research and to choose their undergraduate and postgraduate thesis form this area.

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

We plan to continue our work by collaboration with Protected Areas of Sarajevo Canton (government organisation) and to define important habitats and inform the public through information billboards within protected areas.

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

All results are available on Facebook, and are shared with NGOs as well as GO (Protected Areas of Sarajevo Canton).

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

##### Planned timescale:

1. January –April, 2015 – literature analysis, GIS distribution maps for investigated taxa.
2. May-September, 2015: Field trips with students for botanical surveys and seed collecting and for population status assessment (three field trips per month).
3. October, 2015: Collaborative workshop with NGOs representatives for determination of priority taxa for conservations.
4. November, 2015: Report preparation for government institutions dealing with conservation of plant life with proposal of priority *Knautia* taxa for conservation plan, and a detailed List of *Knautia* taxa for future Red Book of B&H.
5. December, 2015: results summary, access data base preparation final report preparation.

Project actually lasted until November 2015 due to large interest of students and due to partially conducted field studies by students alone, field research was finished earlier and it was possible to shorten the period of field research.

#### 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 expenses	1750	2100	350	Difference was covered by participants of the project
Accommodation and food for field research	200	395	150	
Botanical supplies	200	300	100	
Design and printing of brochures	1000	1000	0	
Comunication and postage costs	0	100	100	
Data base preparation	0	300	300	

Laptop and printer	1120	1500	380	
Software	500	600	100	
<b>TOTAL</b>	4997	<b>6577</b>	1580	

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

Collaboration with GO, since the laws and their implementation is directly dependent upon GO.

**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?**

Yes, brochures, pamphlets were distributed, and are also available through Twitter and Facebook promotion, as well as through Bio.log web page. Also competition for best plant photo was organised for students. Results of this research were presented at ICOEST congress as oral presentation (accepted abstracts for the congress - <http://www.icoest2015.com/abstracts>), and also results are going to be presented on the first Balkan Rufford Small Grant Congress.

**11. Any other comments?**

It was a pleasure to conduct this research mainly because a large interest of students in the research matter. Due to limited funds not all students were able to accompany us in the field but never the less they were more than happy to participate in material herbarisation, and lab work. Plant material gathered in the field was transported in Czech Republic for UPLC analysis for possible easier classification of closely related genera. The data gave us some insight in biochemical composition of different *Knautia* plant parts as well as different species. The research article is in preparation for publication. Also Database is started and is still designed as internal database for Laboratory for research and protection of endemic genofond, but in the future we plan to make the database available for public.

## *Picture Report*

Distribution and populations assessment of endemic taxa from genus *Knautia* of Sarajevos' region as a basis for conservation strategies

Locality **BUKOVIK**: *Knautia sarajevensis* found

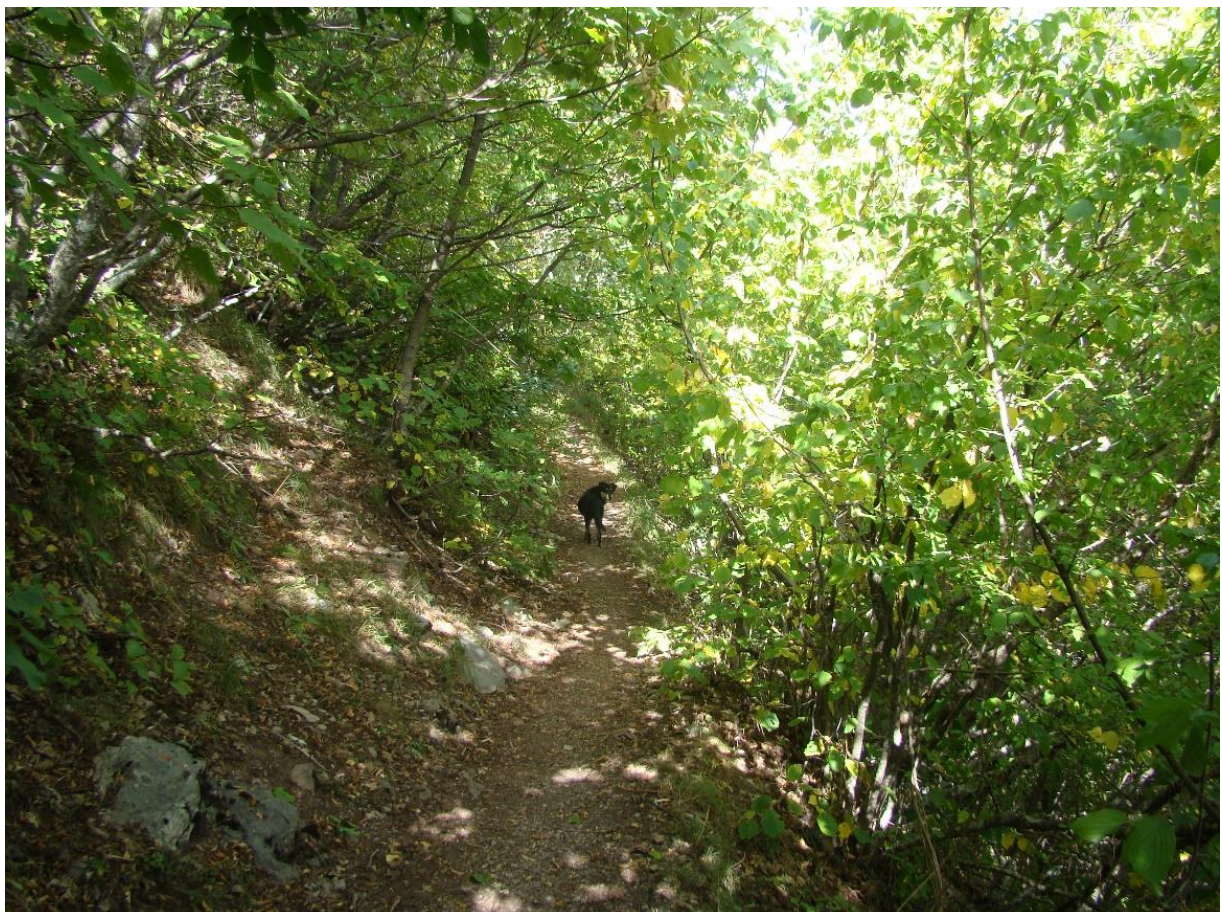


Locality: **UMOLJANI**, No *Knautia* species found





Locality: **LUKOMIR**, *Knautia* species found, but determination unsuccessful, due to very dry season plants were dried out (sun burns)





Locality: **IGMAN**, *Knautia sarajevensis* recorded





Locality: **SKAKAVAC**, *Knautia sarajevensis* recorded



Locality: **TREBEVIĆ**, *Knautia sarajevensis* recorded and *Knautia dinarica*



*Knautia dinarica*



## Secondary metabolite profiles of *Knautia sarajevensis* in Bosnia and Herzegovina

According to The list for the Red Book of Federation B&H and the Red book of Republica Srpska there are 8 taxa from *Knautia* genus in Bosnia and Herzegovina. All eight taxa are endemic.

Since the taxonomy of *Knautia* is still a burning questions (some of the scientific papers sort them in Caprifoliaceae family and some in Dipsacaceae family) it would very interesting to establish metabolic profiles of selected *Knautia* species, as well as out groups (*Scabiosa*, *Dipsacus*) for the purpose of chemotaxonomy. Biochemically such analysis would give an insight into qualitative and quantitative composition of endemic *Knautia* species in B&H. Identification of flavonoid and phenol compounds could also be used for selection of potential new sources of antioxidants and/or antimicrobial substances.

The proposal was be conducted through stated timeline:

1. Material gathering – May/June/July 2015.
2. Morphological analysis - May/June/July
3. HPLC/ GC/MS analysis – July/August
4. Antioxidative and microbial capacity testing - September/October/November
5. Result summary and statistics – December/January
6. Data publishing – February 2016.

1. The material gathering would include different populations of different *Knautia* species (*K. sarajevensis* and ) and selected populations of *Knautia arvensis* as a species with wide distribution amplitude (out-group).

2. Morphological analysis – would include morphological taxonomical characters for species identification. Photo documentation

3. HPLC/GC/MS analysis – analysis of methanol extracts of leaves and flowers of selected populations of *Knautia* taxa for phenolic acids and flavanoids

4. Extracts with high metabolite content will be tested for Antioxidative and microbial capacity

5. All results will be summarized and statistically tested for statistically significant differences and correlation relationships between populations and between taxa.

6. Through this proposal it will be possible to publish quality research papers in indexed journals and it will be a pioneer research regarding metabolite profiling of endemic *Knautia* species found in B&H.

Below is the list of *Knautia* species that are expected to be found in B&H with their synonyms and expected distribution. Some of the species are not confirmed for B&H and this proposal would also elucidate that aspect. Date listed below are official date from Flora Europea.