

Report on the outcomes of a Short-Term Scientific Mission¹

Action number: CA18201

Grantee name: Marina Nonić

Details of the STSM

Title: Assessment of adaptive genetic diversity at the local/range-wide scale, using new molecular genetic/genomic approaches, to facilitate conservation within and outside forests

Start and end date: 24/04/2023 to 02/06/2023

Description of the work carried out during the STSM

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

(max. 500 words)

The main goal of this STSM was to perform a structural literature review and critical analysis about the assessment of adaptive genetic diversity using new molecular genetic/genomic approaches to facilitate conservation within and outside forests. The STSM was connected to Working Group 5: „*Genomic approaches in plant conservation*”.

The structural literature review tools were used to find out the appropriate answers to the questions that have been developed following the research problem, while the meta-analysis and the critical analysis were used to perform a critical assessment of a research idea by comparing various studies that have been already undertaken.

The work included different activities:

- Formulating the research questions, finding search terms, and creating the search blocks;
- Searching in a structured way in Scopus and WoS;
- Narrowing or broadening the search;
- Selecting, downloading, and reviewing scientific papers;
- Meta-analysis, critical analysis, conclusions-recommendations.

¹ This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

Formulating the research questions, finding search terms, and creating the search blocks

The host Prof. Dr. Filippos A. Aravanopoulos and the grantee formulated the research questions and the search terms and created different search blocks, utilizing a Boolean topic search strategy with the specified keywords. Different keywords were used for creating the search blocks, such as genetic, genetic resources, tree, plantation, forest, local adaption, adaptive potential, diversity, F_{ST} outlier, etc.

Searching in a structured way in Scopus and WoS

Two different databases were used: Scopus and Web of Science. We (host and grantee) started our research using two different search blocks (Search 1 and Search 2), firstly for review papers (i), then for journal papers (ii), and for the conferences (iii), in both databases:

DATABASE	SCOPUS			WEB OF SCIENCE		
SEARCH TOPICS	SEARCH 1			SEARCH 1		
TYPE OF RESULTS	<u>SEARCH-1 (i)</u> REVIEW	<u>SEARCH-1 (ii)</u> JOURNAL PAPERS	<u>SEARCH-1 (iii)</u> CONFERENCE	<u>SEARCH-1 (i)</u> REVIEW	<u>SEARCH-1 (ii)</u> JOURNAL PAPERS	<u>SEARCH-1 (iii)</u> CONFERENCE
TOTAL NUMBER OF RESULTS	5,423	87,092	3,154	7,896	176,697	12,318
SEARCH TOPICS	SEARCH 2			SEARCH 2		
TYPE OF RESULTS	<u>SEARCH-2 (i)</u> REVIEW	<u>SEARCH-2 (ii)</u> JOURNAL PAPERS	<u>SEARCH-2 (iii)</u> CONFERENCE	<u>SEARCH-2 (i)</u> REVIEW	<u>SEARCH-2 (ii)</u> JOURNAL PAPERS	<u>SEARCH-2 (iii)</u> CONFERENCE
TOTAL NUMBER OF RESULTS	25	310	8	26	401	26

The Scopus database was better for our research since one result is shown only in one category, and we selected only papers published in scientific journals, so we decided to use it for further research.

Narrowing or broadening the search

To find more specific results related to the adaptive potential of forest trees and F_{ST} outliers, we formulated additional two search blocks (3 and 4) in the Scopus database:

DATABASE	SCOPUS					
SEARCH TOPICS	SCOPUS - SEARCH 1			SCOPUS - SEARCH 2		
TYPE OF RESULTS	<u>SEARCH-1 (i)</u> REVIEW	<u>SEARCH-1 (ii)</u> JOURNAL PAPERS	<u>SEARCH-1 (iii)</u> CONFERENCE	<u>SEARCH-2 (i)</u> REVIEW	<u>SEARCH-2 (ii)</u> JOURNAL PAPERS	<u>SEARCH-2 (iii)</u> CONFERENCE
TOTAL NUMBER OF RESULTS	5,423	87,092	3,154	25	310	8
SEARCH TOPICS	SCOPUS - SEARCH 3			SCOPUS - SEARCH 4		
TYPE OF RESULTS	<u>SEARCH-3 (i)</u> REVIEW	<u>SEARCH-3 (ii)</u> JOURNAL PAPERS	<u>SEARCH-3 (iii)</u> CONFERENCE	<u>SEARCH-4 (i)</u> REVIEW	<u>SEARCH-4 (ii)</u> JOURNAL PAPERS	<u>SEARCH-4 (iii)</u> CONFERENCE
TOTAL NUMBER OF RESULTS	1,152	30,617	1,396	12	166	4

We started our analysis with 25 review papers - from Scopus Search 2 (i), but after a detailed review, we did not find the information important for our research topic. Then, we broadened our research to 166 journal papers – from Scopus Search 4 (ii).

Selecting, downloading, and reviewing scientific papers

We downloaded 166 journal papers. Then, we reviewed all the papers and removed those related to animals, fungi, crops, shrubs, seaweed, and papers related to forest tree species, but irrelevant for the meta-analysis.

Meta-analysis, critical analysis, conclusions-recommendations

Meta-analysis was used to integrate and summarise results from relevant publications selected in the structural review. The database included the following information: article information; source variables; information about the species; dataset variables; and genetic analysis statistics. After the critical analysis, the host and the grantee agreed to remove some papers and the final meta-analysis database included 40 papers. They concluded there are important results related to the Fst outlier and adaptive potential in different angiosperms and gymnosperms and recommended further analysis of the obtained data using different statistical methods.

Description of the STSM main achievements and planned follow-up activities

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section.

(max. 500 words)

The STSM achieved the planned goals. The main output of the STSM is a database of collected literature on the „assessment of adaptive genetic diversity, using new molecular genetic/genomic approaches, to facilitate the conservation of genetic resources”, as well as a detailed meta-analysis database.

The STSM was connected to Working Group 5, whose main aims are to evaluate the potential of conservation genomics and to denote the implementation of pertinent results into practical plant conservation. The STSM relevant Action objectives were: (1) to improve plant conservation in Europe, (2) to evaluate the potential of conservation genetics and genomics, and indicate the possible implementation of their results into practical plant conservation.

The host and the grantee agreed to use the database in the future for further analysis of the obtained results and to write a review paper, as a final result of their collaboration and STSM visit. The output of the STSM for the grantee is acquiring knowledge and experience on forest conservation, using different literature analysis tools and presenting the obtained results.

One of the outputs of this STSM is the strengthening of connections between researchers from the host and home institutions, and the beginning of the long-term future collaboration between the host and the grantee. The grantee was also invited to give a lecture to the Faculty of Agriculture, Forestry and Natural Environment, Aristotle University of Thessaloniki, which was also under the auspices of the Hellenic Scientific Society for Plant Genetics and Breeding. The title of the presentation was “Forest Genetics, Breeding and Conservation in Serbia”. She had an opportunity to participate in lectures given by the host professor at the Faculty, and in the Annual Forest Genetics Training Field Trip in the University Forest of Taxiarchis, during her visit.

The host and the grantee agreed to continue collaboration in the future, through further visits and collaboration in research, application for joint research projects, as well as co-authorship in publishing papers related to the conservation of genetic resources in scientific journals and presenting results at international scientific conferences.