FA1203: Sustainable management of *Ambrosia artemisiifolia* in Europe (SMARTER)

Short Term Scientific Mission Report

Modelling ragweed airborne pollen dispersal using the particle dispersion model HYSPLIT

STSM details

COST STSM Reference Number: COST-STSM-FA1203-20573
Timing of STSM: 02-02-2015 to 16-02-2015

Applicant details

Dr Branko Sikoparija
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Host details

Dr Carsten Ambelas Skjøth
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Summary of the STSM (max 100 words)

During this STSM Dr Branko Sikoparija visited NPARU where he was introduced to using pc-version (windows) of the HYSPLIT model, in the analysis atmospheric transport of airborne pollen and spores. Dr Sikoparija was taught how to setup the model calculations, how to retrieve and present model outputs. In order to be able to interpret and explore in detail given data, a short course on how to use basic features of the ArcGIS was provided during his stay at NPARU.

Purpose of the STSM

The purpose of this STSM was to allow Dr Branko Sikoparija to learn new techniques required for interpretation of observational aerobiology data and to gain access to suitable numerical particle dispersion model.

Description of the work carried out during the STSM

At the very beginning of the STSM the host provided me with the HYSPLIT model installation files and meteorology input files required for analysis of the chosen pollen dataset. This gave possibility for continuous practicing needed for achieving sufficient independency in using the tool. Dr Skjøth introduced me how to setup the various components of the HYSPLIT modelling system and how to retrieve and display the results of calculations. During the first week of the stay, simultaneously with retrieving different outputs from the HYSPLIT model, I have been introduced into the basics of using ArcGIS in order to be able to further analyze the outputs of the HYSPLIT model. During the second week of the STSM I have independently worked on the analysis of the episode of high ragweed pollen counts recorded in Leicester (UK) and Leiden (NL) on 4th and 5th September 2014. The supervision and the support given by Dr Skjøth enabled me to test different HYSPLIT tools in the data analysis (i.e. cluster backward and forward trajectory analysis, particle concentration calculations).

My STSM to NPARU overlapped with the STSM from Dr Claudia Testoni which gave unique opportunity to network further with Italian group of agrobiologists. The spatially and temporally vast dataset brought by Dr Testoni for her work on producing ragweed pollen source inventory over Italy, gave opportunity to discuss its application value also in the analysis of trends in the ragweed airborne pollen characteristics over Europe and changes over Po Valley as a result from *Ophraella* beetle attacks.

Description of the main results obtained

During the STSM I have acquired knowledge on how to setup and run the tools of the HYSPLIT dispersion model commonly used in airborne pollen studies.

The analysis of the high ragweed pollen concentrations recorded in Leicester and Leiden pointed towards Ukraine, Pannonian plain and Rhone Valley as potential sources. The air masses moving at high elevation from Ukraine towards west Europe passed over Pannonian plain and Rhone Valley during different time of the episode. The model calculations confirmed that the pollen released in these source areas could be mixed in the atmosphere sufficiently to reach the height of the air masses traveling towards Netherlands and British Isles.

Future collaboration with the host institution

It is expected that the collaboration between UNSPMF and NPARU continue in the frame of analyzing airborne pollen concentrations but it is also expected to expand to other fields of studied both in NPARU and UNSPMF (i.e. airborne fungal spores, melissopalynology). Collaboration is planned to be long-lasting, thus beyond the lifetime of SMARTER

Foreseen publications/articles resulting from the STSM

Short-term goal include finalizing and submitting the manuscript with the data obtained by

analyzing ragweed airborne pollen transport to Netherlands (Leiden) and UK (Leicester). Also the involvement in finalization of the ragweed airborne pollen source inventory over Italy is foreseen.

Long-term goals include work on the study started within SMARTER WG4 and which will analyze trends in the ragweed airborne pollen characteristics over Europe.

Confirmation by the host institution of the successful execution of the STSM

Copy of the e-mail sent to the Training Coordinator of the COST Action FA1203 is given in Appendix 1.

Novi Sad, 20th February 2015

Dr Branko Sikoparija

APPENDIX 1: Confirmation of the successful execution of the STSM

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Branko Sikoparija <sikoparijabranko@gmail.com>

COST SMARTER: Confirmation of two STSMs at NPARU, Feb 2015

1 message

Carsten Skjoth <c.skjoth@worc.ac.uk>   Sun, Feb 15, 2015 at 9:47 PM
To: "maurizio.vurro@ispa.cnr.it" <maurizio.vurro@ispa.cnr.it>
Cc: Branko Sikoparija <sikoparijabranko@gmail.com>, "Claudia Testoni (claudia.testoni@aslmi1.mi.it)"
<claudia.testoni@aslmi1.mi.it>, MUELLER Heinz <heinz.mueller@unifr.ch>

Dear Dr. Maurizio Vurro

It is a pleasure for me to inform that Dr. Branko Sikoparija and Dr. Claudia Testoni has been visiting National
Pollen and Aerobiology Research Unit, University of Worcester (UK) for two weeks in February 2015 and
successfully carried out two STSMs within the COST Action SMARTER.

The two STSMs has given us the opportunity to work as a team and at the same time both Dr. Sikoparija and
Dr. Testoni have gained new skills in analysing aerobiological data by using atmospheric models and ArcGIS by
using ragweed pollen data.

Thanks to the two STSMs we have both started the work on making inventories for ragweed pollen dispersion
models (before and after 2013, when the ragweed beetle arrived in large numbers in Italy) and analysed several
important transport episodes in the atmosphere with ragweed pollen. These episodes are happening within Italy
or constitutes long range transboundary episodes. The inventories can be used both in connection with the
HYSPLIT model as well as the more advanced COSMO-ART and WRF-Chem models that are utilised and
developed during the lifetime of SMARTER.

Additionally, we have discussed other initiatives that relates to both the impact of the Ophraella Communa
ragweed beetle in relation to atmospheric transport of pollen and the design of local scale experiments on
ragweed pollen emission that are carried out in Serbia and how this can be used in the development of next
generation exposure models in relation to aeroallergens.

Finally, then it was a pleasure to host both Dr Sikoparija and Dr. Testoni and the STSMs are considered were
very productive and it is likely that several publications that address SMARTER objectives will be an outcome of
these STSMs.

Highly regards

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http://www.worcester.ac.uk/discover/dr-carsten-ambelas-skjoth.html