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

Short Term Scientific Mission Report

Aerobiological assessment of *Ambrosia artemisiifolia* pollen release in Italy: regional scale approach for the evaluation of *Ophraella communa* influence on airborne pollen

STSM details

COST STSM Reference Number: COST-STSM-FA1203-020215-053027
Timing of STSM: 31-01-2015 to 14-02-2015

Applicant details

Dr Claudia Testoni
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Host details

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Summary of the STSM (max 100 words)

During her stay at NPARU for this STSM, Dr Claudia Testoni was introduced to HYSPLIT model and ArcGis in order to learn the basic features of both of them. After having produced a ragweed pollen inventory over Italy, starting from daily ragweed pollen concentration levels provided by Italian monitoring stations located in all the Country, Dr Testoni analyzed this data using the skills learned for HYSPLIT and ArcGIS, with a particular regard to the evaluation of the beetle *Ophraella communa* influence on airborne pollen over the Po Valley (Pianura Padana) in Northern Italy.

Purpose of the STSM

The purpose of this STSM was to create a ragweed pollen inventory over Italy and to allow Dr Claudia Testoni gaining new skills in analysing aerobiological data by using atmospheric models and ArcGIS; in particular, to be able to apply them for a study that evaluate the differences on ragweed airborne pollen occurred before and after the appearance of *O.*

Communa, as the beetle was observed feeding on common ragweed plants for the first time in Northern Italy during the summer of 2013.

Description of the work carried out during the STSM

During the first week of work at NPARU, an Italian ragweed pollen inventory was produced starting from data sets of daily *Ambrosia* pollen concentration levels provided by 92 Italian pollen monitoring stations distributed along the whole Country. Seasonal and Annual Pollen Indexes obtained for each site cover a period starting from 2004 to 2013. During this first week, Dr Skjøth also provided me the installation files for HYSPLIT model and ArcGIS, introducing me into the basics of both of them in order to be able to analyze the data sets created. During the second week of the STSM, I applied the skills learned on the analysis of the Italian ragweed pollen inventory created the week before, focusing the attention on several important transport episodes in the atmosphere that are happening within Italy or constitute long range transboundary incidents.

My STSM to NPARU overlapped with the STSM of Dr Branko Sikoparija and, for this reason, Dr Skjøth, Dr Sikoparija and I had the unique opportunity to work together as a team, having also the possibility to discuss the application of the analysis of trends in ragweed airborne pollen characteristics over Europe and decrease of the pollen countings over Pianura Padana mainly due to the presence of *O. Communa* from the year 2013.

Description of the main results obtained

After my two weeks of work at NPARU, I have learned new skills in analyzing aerobiological data by using the atmospheric model HYSPLIT and ArcGIS.

A ragweed pollen inventory over Italy was produced, gaining Seasonal and Annual Pollen Indexes for all the stations that provided their daily concentrations pollen levels. In addition, the knowledge of *Ambrosia* ecology and distribution of the plant allowed to create an index for ragweed suitable habitats over Italy and a map that shows the elevation filter by which we can indicate good or bad habitats for ragweed in this Country.

From these data and working together with Dr Skjøth and Dr Sikoparija, we began to investigate long distance transport events (in particular for stations located in the centre of Italy that show some *Ambrosia* pollen seasonal peak days even if the plant is not present in their area) and short distance transport episodes (for stations located in the Po Valley, taking into consideration the presence of the beetle starting from the year 2013).

Future collaboration with the host institution

Collaboration between NPARU and Local Health Authority Milan 1 (Department of Medical Prevention, Public Health, Life Environments Section) will absolutely continue in the frame of analyzing all the aspects that derived from the creation of the Italian pollen inventory, such as the study on long and short distance transport that in Italy show unique features and perspectives due to the very local distribution of ragweed plants and of *Ophraella* and to the particular Italian orography. Collaboration is planned to be long-lasting, thus beyond the lifetime of SMARTER.

Foreseen publications/articles resulting from the STSM

The results of this STSM and future collaborations with Dr Skjøth and Dr Sikoparija are expected to bring different publications in peer reviewed journals for each of the topics covered during its lasting (i.e. long and short distance transport episodes for Italy), contributing to the scientific objectives of COST SMARTER, especially of WG1 (Biological control) and WG4 (Management evaluation).

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.

Parabiago, 20th February 2015

Claudia Testoni

Dr Claudia Testoni

APPENDIX 1: Confirmation of the successful execution of the STSM

Soggetto:	COST SMARTER: Confirmation of two STSMs at NPARU, Feb 2015
Destinatario:	"maurizio.vurro@ispa.cnr.it" <maurizio.vurro@ispa.cnr.it>
Mittente:	Carsten Skjoth <c.skjoth@worc.ac.uk>
Data:	15/02/2015 21:47
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

Carsten Ambelas Skjøth, PhD, Senior Lecturer

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