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

Short Term Scientific Mission Report

Ophraella communa non-target survey

STSM details

COST STSM Reference Number: COST-STSM-FA1203-28911
Timing of STSM: 03-08-2015 to 31-08-2015

Applicant details

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Summary of the STSM

This STSM was focused on the field explorations of ragweed beetle, *Ophraella communa* (Coleoptera: Chrysomelidae) in South Switzerland and North Italy. Non-target survey, and sampling for genetic studies were realized at twenty site across Torino to Verona. The detailed abundance of ragweed beetle was evaluated at nine sites. Sweeping plants, and visual observations were used for the survey. STSM yielded also to the great collection of native insect which will be compared with Slovak insect guilds. The field observations shed light on *O. communa* potential for biological control. This STSM opened also the door for deeper cooperation with the Host institution.

Purpose of the STSM

The aim of this STSM was to do the field explorations in South Switzerland (Ticino) and North Italy (Lombardy) and investigate:
1, the potential of ragweed beetle to affect and develop on non-target hosts
2, abundance of *O. communa* across habitats
Besides ragweed beetle sampling for genetic studies (genotype by sequencing) was done across bigger territory. We have wanted to quantify and compare abundance of *O. communa* as well composition and structure of the herbivore communities among populations over larger areas and different habitats. In particular, we investigated also *O. communa* presence at

areas without *Ambrosia artemisiifolia* occurrence. The beetle may provide a powerful natural solution to the ragweed problem, but it may also have negative effects on other plants. Therefore one of the most important purposes of this STSM was shed light on this item.

Description of the work carried out during the STSM

During the first week, the work was focused on preparation of the detailed timetable, working material and sampling protocols of the field work in Switzerland and Italy. Twenty sites, Rovio (CH), Corbetta (I), Magenta (I), Magnago (I), Abbiategrasso (I), Galbiate (I), Vigevano (I), Mezzana corti (I), Cassine (I), Pontecurone (I), Mezzanino (I), Alba (I), Bareggio (I), Carvico (I), Ponte San Pietro (I), Liscate (I), Lonate (I), Palazzollo (I), Sirmione (I), and Milano-Baggio (I) were selected for *Ophraella* non-target survey and sampling for genetic studies. In addition some other sites were visited during travelling. The abundance of ragweed beetle was evaluated at nine Italian sites, Magnago, Magenta, Carvico, Sirmione, Bareggio, Corbetta, Alba, Mezzanino, and Abbiategrasso. The base over a period of field work was Corbetta (Italy). Daily activities were divided (depending on weather) into independent field trips. The previously obtained and current data were regularly discussed with other members of the field team from University of Fribourg.

A. The key work carried out during the STSM involved:
1, Non-target survey - the most examined non-target plants were *Xanthium strumarium*, *Helianthus tuberosus*, *Artemisia vulgaris*, *Conyza canadensis*, *Inula hirta*, *I. britannica*, *I. montana, Pulicaria dysenterica* (*vulgaris?*), *Centaurea nigrescens*, and *Helianthus annuus*. The new SMARTER "*Ophraella* non-target survey form" was used to report presence of ragweed beetle on non-target plants. This survey was done in co-operation with Jose Bustamante Eduardo (University of Fribourg).
2, Collection of *Ophraella* beetles for population genetic studies (GBS; genotype by sequencing) was done according to SMARTER Form "*Ophraella communa* sampling for genetic studies", which was developed at University of Fribourg (by Heinz Müller-Schärer). 20 adults were randomly collected at all visited sites across the host plant population (*A. artemisiifolia* as well non target hosts in case).
3, The detailed abundance of ragweed beetle was evaluated following the SMARTER form "*Ophraella communa* abundance sampling" developed by Peter Toth (SUA, Nitra, Slovakia) and Benno Augustinus (CABI, Delemont, Switzerland).
Besides sweeping/beating plants into a sweeping net at each of these nine sites was done to survey arthropod community on ragweed – 3x30 sweeps into sweeping net for a total of 3 samples per site – samples were killed by Ethyl Acetate, placed as dry to plastic vials and transported for analysis to Slovakia after STSM.

B. Extra work carried out during the STSM involved
1, Help with transportation, and managing of plants within plots including of *Ophraella* adults, larvae and egg collections and redistribution. Collections of adult beetles was done also for establishment of the new rearing in the quarantine at University.
2, Assistance for Suzanne Lommen team in population dynamic survey.

Description of the main results obtained

There are many very interesting data retrieved during this STSM:

Non-target *Ophraella* hosts survey
Some of the most interesting and entomologically exciting data during STSM attendant upon this topic:
- *Ambrosia trifida* was recorded for the first time in Italy! the plant was heavily infested by *O. communa*.
- *O. communa* is able to feed (as larva and adult) and laying eggs under field condition on *Xanthium strumarium, Helianthus tuberosus*, and *Ambrosia trifida*.
- *Xanthium strumarium* was heavily infested and damaged! many adults, larvae and eggs! *O. communa* was found on *Xanthium* at all sites, where *Xanthium* occurred even if *Ambrosia artemisiifolia* was not presented in the broader surrounding!
- Surprisingly, the leaves of *Centaurea nigrescens*, were heavily infested (nibbled) by *O. communa* adults at one site!
- *Artemisia vulgaris* was slightly affected only as young/fresh plant. Anyway adults were presented on several places.
- None of *Inula* species (*I. hirta*, *I. britannica*, *I montana*) found during this survey was infested and damaged, except of negligible adults feeding on *I. hirta* at one site. Surprisingly *I. graveolens*, which was heavily infested last year at Balerna site was not found on the spot at all!
- *Pulicaria* spp. (*dysenterica*/*vulgaris*) were without any breakings
- Sunflower: none of the screened sunflower field was infested by *O. communa* during this search
Native European Herbivores
- Collections of herbivore samples were obtained by sweepings at nine different sites and all samples were taken to Slovakia for analyses, determination and to be compared with Slovak guilds.

Future collaboration with the host institution

Collaboration with the host institution will continue and it will be even enhanced in coming years. All of the topics of this STSM will be still in the spotlight. In addition *Ambrosia* population dynamics survey will open other horizons for fruitful scientific cooperation and joint publications. There is also a

good potential to create/strengthen a multidisciplinary "ecology" striking force to deal with *Ambrosia*.

Foreseen publications/articles resulting from the STSM

Part of the results of this STSM research will be presented at the next SMARTER WG1 meeting and Joint EPPO/COST-SMARTER Workshop on the Evaluation and Regulation of the use of Biological Control Agents in the EPPO Region, which will be held in Budapest, Hungary in 22-24 November 2014. Joint research and future collaboration is expected to bring a few peer review publications (e.g. Host preference of *O. communa*, Genetic variability of *O. communa,* Natural herbivores of *Ambrosia* across habitats and regions, Population dynamic survey etc.).

Vráble, 2 October 2015

Peter Tóth