



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

Short Term Scientific Mission Report

Improving understanding of *Ambrosia* seed biology for demographic models

STSM details

COST STSM Reference Number: COST-STSM-FA1203-35797

Timing of STSM: 4 – 14 Nov 2016

Applicant details

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Host details

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Summary of the STSM

Ambrosia artemisiifolia is an annual plant with long-lasting seed bank. To better manage it, it is crucial to understand the population dynamics, and specifically the dynamics of the seeds (their production and dynamics in the soil seed bank), and how this is affected by management. The applicant, as coordinator of the SMARTER Task Force Population Dynamics (TF Popdyn), developed a population dynamic model of *Ambrosia* and coordinated a concerted 3-year survey of >50 natural *Ambrosia* populations to parameterize the model. A preliminary analysis revealed that estimates of demographic rates related to the seeds (seed survival, germination rates) based on this survey are not very precise. This is due to the fact that seed samples from the soil were only taken once a year, and that no individual seeds were monitored through time.

To improve the understanding of *Ambrosia* seed biology, and finally improve the model, a STSM was conducted to Gerhard Karrer, coordinator of SMARTER WG2. He is an expert in botany and experienced in ragweed biology and led several experiments on ragweed seed biology and on the effect of mowing regimes on ragweed. During the STSM, these (mainly unpublished) data were collected, analysed and discussed. They will now further be integrated into the demographic model, and to model the effect of mowing regimes.

Purpose of the STSM

The specific aim of this STSM was to analyse unpublished data on *Ambrosia* seed biology, to (i) enhance the demographic model of ragweed developed by the TF Popdyn, and (ii) to better assess the effect of mowing regimes. In addition, we aimed to iii) ensure collaboration and joint publication after the end of the Action.

Description of the work carried out during the STSM

- Collect, analyse & discuss unpublished data of experiments on the survival in the soil seed bank (with Melinda Leitsch-Vitalos and Gerhard Karrer), on the recruitment of seeds (with Gerhard Karrer), and on the effect of mowing on the production and viability of seeds and the long-term effects in the soil seed bank (with Ivana Milakovic and Gerhard Karrer).
- Discuss improvements of the demographic model, and modelling the effect of mowing
- Discuss future collaboration, publication and responsibilities

Description of the main results obtained

- Estimates of seed survival throughout the year (in contrast to existing year-to-year survival rates), age-dependent and soil depth-dependent seed survival and recruitment, viability of seeds on the plants and post-harvest ripening values after mowing
- Suggestions for improvements of the demographic model (include an age-structured seed bank, include a seed viability factor into the model)
- Roadmap for publication of a joint paper on the impact of mowing on ragweed population dynamics

Future collaboration with the host institution

The host and the grantee will continue collaboration on the publication of the population dynamics study and the effect of mowing.

Foreseen publications/articles resulting from the STSM

A joint paper on the impact of mowing on ragweed population dynamics will be published early 2017.

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

Cf. attached letter by the host.

Acknowledgements

I greatly acknowledge Gerhard Karrer and his team for great collaboration.

Fribourg, 23 November 2016

Suzanne Lommen