

Short Term Scientific Mission

Scientific Report:

Ambrosia artemisiifolia L. seed collection along a
latitudinal gradient in Western Europe.

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1. Purpose of the STSM

The STSM took place in the perspective of my PhD. thesis on *Ambrosia artemisiifolia* L. that began a year ago. The aims were the following; to accomplish a measurement campaign on *A. artemisiifolia* L., in order to collect seeds from different origins and to establish collaborations between my Unit (Biodiversity and Landscape Unit, University of Liège, Belgium) and the National Institute for Agronomic Research (INRA).

2. Description of the work carried out during the STSM

The STSM is divided in two parts.

First I collected data in populations of *A. artemisiifolia* from the South of Netherlands to the South of France. I measured phenotypic traits (height, diameter, biomass), reproductive traits (number and weight of seeds) and functional traits (specific leaf area), as well as the populations description (location, level of native flora competition, type of soil, type of habitat, number and density of *A. artemisiifolia* plants).

Then, I performed a scientific stay at the INRA from Dijon, where I took advantage of the knowledge and tools from the scientists that had already worked on *A. artemisiifolia*. I could use their laboratories to analyze the samples I collected during my measurement campaign. This work consisted in opening each bag containing *A. artemisiifolia* plants (around 500) and chafe the plants by hand with appropriate protection (the pollen of this species is highly allergenic, so I constantly had to put a mask, handle plants with gloves, and take care of using often a vacuum cleaner). I then gathered the seeds which had fallen down during the process and refined it with a prompter machine, then bagged it separately. I finally counted every seed with a counter machine, and weighted every bag to have the mean mass.

I also discovered how INRA and the “Observatoire des Ambroisies” were working, and learned what their research fields and running studies were. I also participated to team meetings of the “Biology and weed management research” Unit. During one of those meetings, I had the opportunity to present my Thesis, explain the objectives of my experiments, and discuss the implementations with the INRA scientists.

3. Description of the main results obtained

This STSM mission led to grow a dataset on *A. artemisiifolia*. Once this dataset is complete, it will be analyzed and studied, this will hopefully lead to a scientific publication on the adaptive capacity of this species to invade the North of Western Europe.

This STSM also gave me the opportunity to collect a large amount of seeds, allowing further experiment and exchange. I have already planned to give a significant part of

these seeds to the COST-SMARTER action, through the principal coordinator, Ms Suzanne Lommen.

4. Future collaboration with host institution

Our perspectives would be to maintain the scientific relationship between the two institutions in order to benefit from each other's work and knowledge, thus allowing us to develop new experiments.

5. Foreseen publications resulting from the STSM

The early results will be presented through a scientific poster during the 19th National Symposium on Applied Biological Sciences, on 7th of February 2014. This poster will be titled: "Performance variations of the noxious invader *Ambrosia artemisiifolia* L. along a latitudinal gradient: is there an impediment to invasion? ".

The abstract is the following:

Ambrosia artemisiifolia L. is an invasive species from North America, causing a health crisis in Europe due to its highly allergenic pollen. In Southern France, the invasion is highly virulent. Populations can be found further in the north, but hardly survive thanks to a steady income of seeds from human activities.

To understand how the invasion will evolve, we need to understand the role of both climate and competition on the development of *A. artemisiifolia*. A way to decrypt that role is to assess the performances of the species along a latitudinal gradient. To do so, we chose 14 populations from Netherlands to Southern France. Populations and its habitats were recorded. Furthermore, we measured phenological, reproductive, and functional traits on randomly selected plants, together with the surrounding completion by native vegetation. Two campaigns were necessary to measure both the maximum biomass occurring in August and the seed production in October. We used multiple regression analysis, to show the variation traits along the climatic gradient and determined if there is a drag against the invasion expansion.

This study was performed in collaboration with the National Institute of Agricultural Research (INRA), which provided useful tools and a laboratory to analyze samples. The campaigns were subsidized by an action of the European framework COST: SMARTER (Sustainable management of *Ambrosia artemisiifolia* in Europe), which involves over 120 experts from 33 countries.

Measurements obtained during this STSM will probably be a part of a future scientific paper on the same subject.

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



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Confirmation of the successful execution of the STSM

William Ortmans from the University of Liège, Gembloux Agro-Bio Tech, Biodiversity and Landscape Unit, was hosted in Inra Dijon (UMR1347 Agroécologie) for his short-term scientific mission in the frame of the SMARTER COST Action.

During four weeks in September (one week) and November (three weeks) 2013, William Ortmans carried out his study consisting on surveys and collection of ragweed plants in the Rhône valley and North Burgundy. He successfully completed his program by learning methods to analyse seed production of this annual plant. His work will be completed in his lab

If you have any questions regarding the stay of William Ortmans in Dijon, please let me know.

Sincerely yours,

Bruno Chauvel