



FA1203: Sustainable management of *Ambrosia artemisiifolia* in Europe (SMARTER)
Short Term Scientific Mission Report

Applying newly developed microsatellites to study the population genetics of *Ambrosia psilostachya*

STSM details

COST STSM Reference Number: COST-STSM-FA1203-35768
DNA sequencing of *Ambrosia* species
Timing of STSM: 07-11-2016 to 18-11-2016

Applicant details

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Host details

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Summary of the STSM

Population genetic studies of the annual weed *Ambrosia artemisiifolia* indicate repeated introduction events from different sources in North America and admixture processes within its new range in Europe. This might be a main driver for the wide distribution of this plant in Europe. In Southern Europe, i.e. in the Mediterranean, this annual species is rare or missing. But there is another *Ambrosia* species expanding its range, namely *Ambrosia psilostachya*. This species is perennial, rarely produces seeds, and spreads mostly by fragments of belowground organs (roots, shoots). This clonal behavior may have caused a different introduction history which is not resolved by now.

The lab of Valerie Le Corre in Dijon (INRA) developed new microsatellites for *Ambrosia* that might also work for resolving population genetics of other *Ambrosia* species. *A. psilostachya* is a near relative of *A. artemisiifolia* and candidate for the use of these microsatellites to resolve the introduction history and the further spread throughout Europe.

Additionally, during the last years Gerhard Karrer (University of Natural Resources and Life Science, Vienna) has collected a huge number of leaf samples of *A. psilostachya* from populations spread all over Europe. Therefore, during my STSM in Dijon these samples were taken to test the performance of the newly developed microsatellite markers.

Time schedule of the STSM

After an initial meeting with Valerie Le Corre (INRA) and Bruno Chauvel (INRA) I got a detailed introduction into all operations and lab procedures necessary for my work in the lab. After that, Valerie and me started immediately with the DNA extraction from the *A. psilostachya* leaf samples which were provided by Gerhard Karrer and Bruno Chauvel. Since there are of course differences in the genetic structure of *A. artemisiifolia* (the species for which the microsatellite markers were developed) and *A. psilostachya* I had to optimize the

protocol for relations and concentrations of the various ingredients and chemicals in order to provide an optimal milieu for the DNA to be analysed.

In the next step Valerie and me were testing many different PCR-conditions for the microsatellite analysis, especially what the various primer/polymerase-combinations was concerned in order fix the optimum conditions for the experiments.

After a brief validation of a set of markers showing reliable PCR amplifications on gel electrophoresis, Valerie and me started with the big sampling, comprising 30 different populations of *A. psilostachya*.

Further use of data within SMARTER and foreseen publications/articles resulting from the STSM

Since the final results will not be available before the STSM is over, there will be a final group meeting within the next couple of weeks to discuss future publication of the results and of course possibilities of further collaboration. However, this STSM enables the extension of initial collaboration between SMARTER members of WG2, TF genetics and the taxonomy group. Both involved groups will be able to provide high scientific impact on the knowledge of plant invasions based on the work within the STSM because as these markers seem to work well with *A. psilostachya* they might be also applicable to resolve the introduction history of *Ambrosia tenuifolia* and the nearly total disappearance of the only native European *Ambrosia*-species *A. maritima* in Europe.