

# Assessing fungal communities of native and exotic *Fraxinus* species planted in North American and European arboreta.

Short Term Scientific Mission (STSM), COST Action FP1401

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## Summary

One of the greatest threats to global biodiversity is non-indigenous invasive pests and pathogens. Two well-known examples of introduced pests and pathogens of *Fraxinus* (ash) in Europe and in North America are the invasive fungal pathogen *Hymenoscyphus fraxineus* in Europe, which is the causal agent of ash dieback and is currently threatening common ash (*Fraxinus excelsior*), and the emerald ash borer (EAB), *Agrilus planipennis*, which has been killing all native *Fraxinus* species in the Eastern USA and Canada. The main purpose of this work was to use a DNA metabarcoding approach to 1) describe the fungal biota inhabiting congeneric species of *Fraxinus* growing under the same conditions in natural forests and in arboreta; 2) determine any biogeographic patterns of fungal populations associated with *Fraxinus* species; 3) determine possible host shifts and future threats to *Fraxinus* species that in some places are already experiencing large-scale population decline because of these invasive insect and pathogen pests.

Foliage and stem samples were collected at the end of May, mid-August and at the end of September prior to leaf senescence/shed in 2014 and 2015 from *Fraxinus* species at 19 locations in the USA and Europe. From each sample area one healthy looking leaf sample (leaflets were separated) from each tree was selected. Total genomic DNA of all samples from North America and Europe was isolated and samples were uniquely barcoded and prepared for sequencing. Samples were sent to Mr DNA Lab in Texas, USA, for sequencing Illumina MiSeq and bioinformatics will be performed on the sequence data set. We are presently awaiting those results, and a manuscript including all collaborators to the project is planned. Preliminary results of the project will be presented in a poster at the upcoming IUFRO 125<sup>th</sup> Anniversary Congress. A summary of the work from this STSM will contribute to that poster presentation.

The results of this STSM will contribute to WG2 objectives by providing information regarding modern molecular techniques for characterizing fungal populations in arboreta that can contribute to the development of protocols for an early warning system against harmful fungi in arboreta or sentinel plantings.