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Genomics and Metabolomics in *Fraxinus excelsior* in the context of ash dieback

Miguel Nemesio-Gorriz *

*Teagasc, Dublin, Ireland

miguel.nemesio@hotmail.com

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Abstract

Common ash (Fraxinus excelsior) is a broadleaved tree species native to Europe and Asia seriously threatened by the invasive fungal pathogen Hymenoscyphus fraxineus,. This pathogen cause ash dieback resulting in the decimation of ash populations throughout the native range of Fraxinus excelsior. A small proportion of ash genotypes show natural resistance to ash dieback. However, the factors determining resistance and susceptibility against ash dieback in Fraxinus excelsior are not completely understood. Candidate metabolites and genes were identified using metabolomics and high density SNP genotyping, respectively, in cohorts of ash genotypes with different levels of susceptibility to ash dieback. Results in the metabolomics analyses showed metabolites mainly in the coumarin and the secoiridoid biochemical families. Coincidentally, genes involved in the biosynthesis of these metabolites showed genotypic variants in the tolerant and susceptible cohorts of ash genotypes. These concurring results using a multiomics approach reveal strong evidence for some of the main factors responsible for resistance against ash dieback in Fraxinus excelsior.

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Biography

Miguel Nemesio-Gorriz is a researcher with a background in Pharmacy and Plant Science. He conducted his PhD studies in Biology at the Swedish University of Agricultural Sciences (Uppsala, Sweden) focusing on the molecular interaction between Norway spruce and Heterobasidion annosum. s.l., a pathogenic fungus causing root and stem rot. After his PhD, Dr Miguel Nemesio-Gorriz was recruited by Teagasc (Dublin, Ireland), first as a postdoctoral researcher and later as a research officer. During his years at Teagasc he studied resistance to ash dieback in common ash (Fraxinus excelsior) using a multidisciplinary approach to identify and establish a collection of ash genotypes with resistance to ash dieback. Currently, Dr Miguel Nemesio-Gorriz is enjoying a career break in Spain, where he recently identified evidence of ash dieback and reported the finding for the first time in the country.

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