IDENTIFICATION OF GENES INVOLVED IN THE RESISTANCE RESPONSE OF *PINUS PINASTER* TO THE PINEWOOD NEMATODE INFECTION

Inês Modesto[1,2,3], Lieven Sterck[3,4], Isabel Carrasquinho[5,6], Yves Van de Peer[3,4,7], and Célia Miguell,[2,8]

Pine wilt disease (PWD), caused by the pathogenic nematode *Bursaphelenchus xypophilus*, is a serious threat to conifer forests in Asia and Europe. In the Iberian Peninsula, *Pinus pinaster* is the main species affected by this disease, and trees start to wilt and die soon after the infection. Despite the high susceptibility of most *P. pinaster* trees, a previous study has shown that some individuals display a resistance phenotype after inoculation and that this trait is heritable. Understanding the genetic basis of this resistance to PWD can be of extreme relevance for future programs aiming at reducing PWD in *P. pinaster* forests. In order to test if contrasting phenotypes are consistent with differential responses of gene expression after infection with *B. xypophilus*, RNA-seq was used to compare transcriptional changes between resistant and susceptible seedlings. Our analysis showed a more intense defense response in plants resistant to *B. xypophilus* infection, with a higher number of differential expressed genes (DEGs) in resistant plants (1281) than in susceptible ones (773). Although part of the defense response is shared between resistant and susceptible plants, gene set enrichment analysis highlighted biological processes and molecular functions that may interfere with nematode feeding, growth, and reproduction. This is the first work that enlightens the mechanisms involved in *P. pinaster* resistance to PWD.

[1] ITQB NOVA, Universidade Nova de Lisboa, Oeiras, Portugal, (ismodesto@itqb.unl.pt).
[2] iBET, Oeiras, Lisboa, Portugal.
[3] Department of Plant Biotechnology and Bioinformatics, Ghent University, Ghent, Belgium.
[4] VIB-UGent Center for Plant Systems Biology, Ghent, Belgium.
[5] INIAV, Oeiras, Portugal.
[6] LEAF—Linking Landscape, Environment, Agriculture and Food, Instituto Superior de Agronomia, Universidade de Lisboa.
[7] Department of Biochemistry, Genetics and Microbiology, University of Pretoria, Pretoria, South Africa.
[8] Biosystems & Integrative Sciences Institute, Faculdade de Ciências, Universidade de Lisboa (FCUL), Lisboa, Portugal.

Citation for proceedings: Nelson, C. Dana; Koch, Jennifer L.; Sniezko, Richard A., eds. 2020. Proceedings of the Sixth International Workshop on the Genetics of Host-Parasite Interactions in Forestry—Tree Resistance to Insects and Diseases: Putting Promise into Practice. e-Gen. Tech. Rep. SRS–252. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 170 p.