

## P6-09 Phenotypic and genetic sources of variability of cavitation resistance in *Pinus canariensis*

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In Mediterranean ecosystems, water shortage is the main factor constraining survival and growth of plants. Xylem hydraulic properties are a key factor for the general function of plants as they exert a strong influence on water transport and therefore on the potential for carbon uptake. Resistance to cavitation has been considered a major character involved in drought tolerance. However, variation in cavitation vulnerability could be accompanied by a trade-off with other water transport and physiological traits. We investigated stem xylem vulnerability to cavitation in *Pinus canariensis*, the only endemic pine of the Canary Islands (Spain). We used the 'Cavitron' technique (Cochard 2002; Cochard *et al.* 2005) to construct xylem vulnerability curves.

To assess genetic and environmental effects on vulnerability to cavitation, the xylem water pressure causing 50% loss of hydraulic conductivity ( $P_{50}$ ) was measured in plants from eight contrasted ecological regions covering the whole ecological range of the species, at a dry site (approx. 300 mm per year) and a wetter site (800 mm per year). Relationships with other plant traits (survival, ontogeny, growth) and with some environmental parameters were also examined.

We found a strong influence of the site of plantation on the vulnerability to cavitation, in the wet site  $P_{50}$  varied between -3.1 MPa and -4.6 MPa whereas in the dry site the highest values exceeded -6 MPa. All populations were plastic for this trait, showering lower  $P_{50}$  in the dry site. In contrast to survival, vulnerability to cavitation was not clearly related with the conditions of origin and unexpectedly some populations from favourable environments showed some of the lowest values of  $P_{50}$ . Growth traits also presented a high phenotypic plasticity but scarce differentiation among populations.

All this results are discussed on the framework of ecotypic differentiation and drought-tolerance of the species.

**Keywords:** Ecophysiology, Genetics and Breeding, *Pinus canariensis*, Cavitation resistance, Drought tolerance, Phenotypic plasticity

