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Title: Pining for answers: Study of cationic amino acids (CATs) transport in
maritime pine *Pinus pinaster* Aiton

Amino acid (AA) transporters are membrane proteins involved in AA mobilization within and between cells and cells compartments. In plants, these transporters are responsible of AA transport from sink to source organelle/cell and vice versa. They have a variety of biological functions, including phloem loading and unloading, seed development, intracellular transport, and organic nitrogen (N) assimilation in roots (Dinkeloo et al., 2018). Phenylalanine (Phe) is an aromatic AA synthesized through the shikimate pathway, which serves as a skeleton for phenylpropanoid compounds. Widhalm et al. (2015) confirmed the existence of a cationic AA transporter in *Petunia hybrida* (PhCAT) that is involved in Phe transport from the plastids to the cytosol in flowers.

Pinus pinaster is a conifer model tree with ecological and economical importance due to its forestry and biotechnological interest. Molecular studies have been developed, especially related with N transport, metabolism, and regulation as well as wood formation (Castro-Rodríguez et al., 2016, 2017; Ortigosa et al., 2020, 2022). The objective of this study is to identify cationic amino acid transporters (CATs) in maritime pine (*P. pinaster*) and to elucidate the intracellular and intercellular transport of amino acids.

In our research group, 9 CATs have been identified in *P. pinaster* (PpCATs) using differential transcriptomic profiling in different tissues. The structure and topology of the membrane proteins, their gene expression levels and subcellular localization have been studied for PpCAT3, PpCAT9, PpCAT10 and PpCAT11. PpCAT3 and PpCAT9 are localized in the plasma membrane, PpCAT11 in the tonoplast while PpCAT10 is found in the chloroplast membrane. Furthermore, the localization of PpCAT10 was verified by chloroplast isolation and confirmed using an organelle marker. The location of PpCAT10 in the plastid membrane and its expression pattern suggest that this AA transporter has a critical role in AA transport from plastids to the cytosol (and/or vice versa) during seasonal growth in maritime pine.

Key words: cationic amino acid transporters, *Pinus pinaster*

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