AMMONIUM UPTAKE, TRANSPORT AND NITROGEN ECONOMY IN FOREST TREES

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Forests ecosystems play a fundamental role in the regulation of global carbon fixation and preservation of biodiversity. Forest trees are also of great economic value because they provide a wide range of products of commercial interest, including wood, pulp, biomass and important secondary metabolites. The productivity of most forest ecosystems is limited by low nitrogen availability and woody perennials have developed adaptation mechanisms, such as ectomycorrhizal associations, to increase the efficiency of N acquisition and metabolic assimilation. The efficient acquisition, assimilation and economy of nitrogen are of special importance in trees that must cope with seasonal periods of growth and dormancy over many years. In fact, the ability to accumulate nitrogen reserves and to recycle N is crucial to determine the growth and production of forest biomass. Ammonium is the predominant form of inorganic nitrogen in the soil of temperate forests and many research efforts are addressed to study the regulation of ammonium acquisition, assimilation and internal recycling for the biosynthesis of amino acids, particularly those relevant for nitrogen storage. In our laboratory, we are interested in studying nitrogen metabolism and its regulation in maritime pine (*Pinus pinaster* L. Aiton), a conifer species of great ecological and economic importance in Europe and for which whole-transcriptome resources are available. The metabolism of phenylalanine plays a central role in the channeling of carbon from photosynthesis to the biosynthesis of phenylpropanoids and the regulation of this pathway is of broad significance for nitrogen economy of maritime pine. We are currently exploring the molecular properties and regulation of genes involved in the biosynthesis and metabolic fates of phenylalanine in maritime pine. An overview of this research programme will be presented and discussed.

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