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Abstract Book

Natacha Vieira, Nelson Saibo,
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Sociedade Portuguesa de Fisiologia Vegetal

S5/P9: CSRAV1: A CANDIDATE GENE FOR IMPROVING LIGNOCELLULOSIC BIOMASS YIELD

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Fast-growing tree species of *Populus* spp., *Salix* spp. and *Eucalyptus* spp. are cultivated to produce wood in a short time. Poplars are cultivated with cycles of 15-18 years to obtain saw timber and peeler logs, but when grown as short-rotation coppice (SRC) to produce biomass, planting density increases and rotation is considerably reduced (3-5 years). In this regard, research efforts are focused in the identification of traits and loci that allow the generation of improved SRC biomass-yielding genotypes. Biomass yield is a highly complex trait as it is the combined outcome of many other complex traits, each under separate polygenic control. Among profitable biomass yield-related traits are the amount of sylleptic branching and the length of winter dormancy. In poplar and in a few other Salicaceae species some lateral buds grow out sylleptically, the same season in which they form without the need of an intervening rest period. Sylleptic branching in poplar increases branch number, leaf area and general growth of the tree in its early years, and is a reasonable predictor of coppice yield. On the other hand, the length of winter dormancy determines the extent of the growth period.
Our group has characterized the *RAV1* gene of *Castanea sativa* (*CsRAV1*), encoding a transcription factor of the subfamily RAV (Related to *ABI3/VP1*). *CsRAV1* expression shows a marked seasonal pattern, being higher in autumn and winter both in stems and buds. We generated transgenic lines of the hybrid clone *Populus tremula* x *P. alba INRA 717 1B4* constitutively expressing *CsRAV1*. These *CsRAV1*-expressing poplars develop sylleptic branches only a few weeks after potting. In addition to the sylleptic branching phenotype, these trees show phenological features that could give rise to an extended growth period. We are currently assessing the phenotype and behavior of these transgenic trees in a field trial, and ultimately, we will evaluate the impact on lignocellulosic biomass quality and production.

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