Fifth International Conference of the
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Somatic Embryogenesis and Other Vegetative Propagation Technologies

September 10-15, 2018

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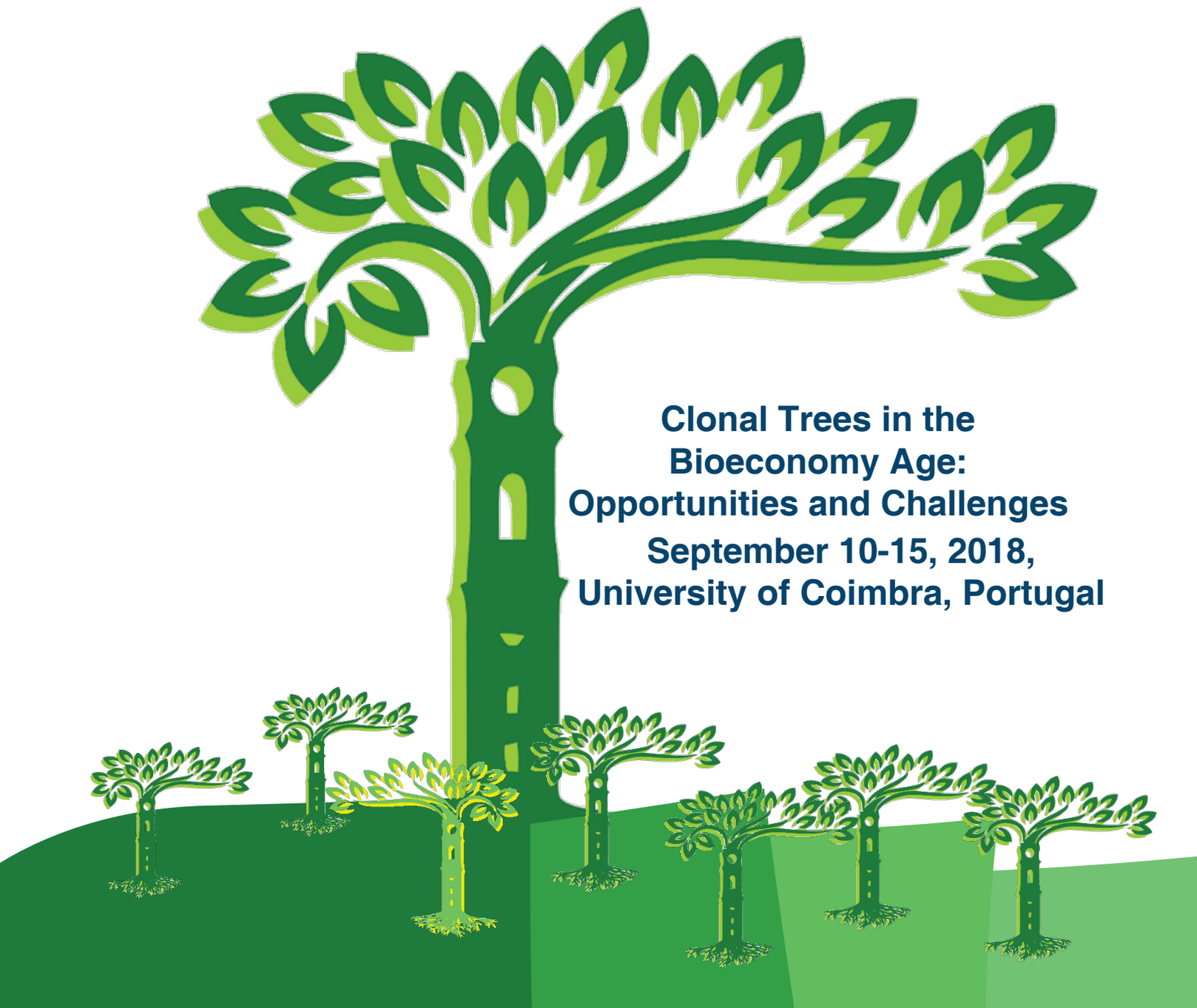

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Clonal Trees in The Bioeconomy Age: Opportunities and Challenges

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Performance of culture lines established *in vitro* from a monumental birch tree

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Biotechnological approaches by using in vitro culture techniques can be applied for clonal propagation and genetic transformation. Furthermore, they offer an alternative for ex situ conservation of elite genotypes, including monumental trees which are characterized by their high biological, ecological, historical and cultural values. It is well known that clonal propagation and in vitro morphogenesis of adult trees is negatively affected by the maturation-related loss of rooting and regeneration abilities. However, little is known about the effect of the position of the initial explants (based in their location or topophysis on the branch) on their in vitro performance. The aim of this work was to micropropagate a mature white birch tree (*Betula pubescens* ssp. celtiberica), and to study the in vitro response of shoot culture lines established from different crown branches. The tree is included in the catalogue of monumental trees (https://www.monumentaltrees.com) with nº 17602. For in vitro establishment, newly grown shoots were collected in June from top branches as well as from "epicormic shoots" originated on thick lower crown branches near to the trunk junction. Nodal segments, bearing one axillary bud, were labelled "1 to n" from the first uppermost (1) node position to the bottom (n) of the shoot, and used to establish different culture lines that were maintained separately in subsequent proliferation cycles. Woody Plant medium supplemented with 0.5 mg L^{-1} N^6-benzyladenine and 0.001 mg L^{-1} naphthalene acetic acid (NAA) was used for establishment of cultures, and Murashige and Skoog (MS) medium supplemented con 0.4 mg L^{-1} meta-topoline and 0.01 mg L^{-1} NAA was used for proliferation. After 4 and 6 weeks of culture, the nº of shoots, length of longest shoot and rooting percentage were recorded. We successfully established seven culture lines, three of them from top branches and four from thick branches. Although all lines exhibited high morphogenetic capacity and there were no great differences among them in shoot multiplication, the highest proliferation rate was achieved in one line derived from epicormic shoots. Results showed that the use of MS medium and meta-topoline are suitable for axillary bud propagation of white birch. Roots were formed in the proliferation medium and rooting rates ranged from 87 to 100%, depending on the culture line. Rooted plants were successfully acclimatized in greenhouse.

Keywords: *Betula pubescens*, mature, meta-topoline, monumental, topophysis

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