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Potential Biomass Production of a Short Rotation Crop in Portugal

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Abstract:

There is a growing consensus that CO₂ emissions from burning fossil fuels are altering the global climate. The Portuguese government aims to reduce national CO₂ emissions by 8 %, at the levels of 1990, by 2012. The use of short rotation crops (SRC) such as willow and poplar as an energy source that produces very low net CO₂ emissions could help meet these targets. In 2008, in the framework of the research project PTDC/AGR-CFL/64500/2006, a SRC crop was established in the Trás-os-Montes Region, Northern Portugal. The SRC was installed in a 4 ha area using willow (local hybrid *Salix alba* x *Salix fragilis* and a Swedish *Salix* L. clone, Terra Nova), poplar (local *Populus nigra* and *Populus x euroamericana*, clone I-214) and ash (*Fraxinus angustifolia*). The crop was planted by simply pushing cuttings using a double row design with densities ranging from 15000 to 20000 cuttings per hectare for willow and 10000 to 15000 cuttings per hectare for poplar and ash. The cut back was done one growing season after plantation to encourage the development of coppice to produce more shoots. The SRC research trial is in the second year of the first 3-year cutting cycle. At this stage the potential biomass production and carbon storage were assessed. Poplar and willow clones presented higher growth and higher number of shoots per stool than their native counterparts. They also presented higher biomass production and, consequently, higher carbon storage. The potential biomass production ranged from 149.7 kg ha⁻¹ to 1980.0 kg ha⁻¹ for ash and poplar I-214, respectively, and, the carbon storage ranged from 74.9 kg ha⁻¹ to 990.0 kg ha⁻¹ for the same species. Although our results came from a Mediterranean Region they are consistent with the results from other studies in Central Europe.