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A new machine for the extraction of SRC stumps for biomass production

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Short rotation coppice (SRC) on agricultural land is a strategic crop for the production of biomass fuel. Much research have been devoted for the optimization of harvesting and logistic operations of SRC, but few studies address the problem of field restoration, whose costs had been just estimated. In this presentation we show the results of a study conducted on an experimental poplar plantation (8 years old, 3 clones, two soil textures) where we compared a common forest mulcher against a dedicated equipment designed for uprooting and cleaning the whole stumps, leaving them ready for a subsequent collection and transformation. Productive time, fuel consumption and work quality were recorded and analyzed.

Results show that the stump removal productivity of the dedicated uprooter is double compared to the mulcher and with a much lower fuel consumption. The working speed of the uprooter is significantly influenced by soil and clone type, while the mulcher showed a constant working pattern. The yield of stump biomass varies with clone type. It represents approximately 20% of the total biomass obtained along the plantation's productive life, confirming the importance of its recovery for energy use. According to our calculations the value of stump biomass could cover the cost of the whole operation if the uprooter system is deployed, against a mulching operation whose cost exceeds 1,600 €/ha and provides lower quality of land preparation.