

## Selection of Most Appropriate Poplar and Willow Cultivars for Landfill Remediation Using Plant Physiology Parameters

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**Abstract :** The effect of landfills on the environment reflects in the dispersion of the contaminants on surrounding soils by the groundwater plume. Such negative effect can be mitigated with the establishment of vegetative buffers surrounding landfills. The "TreeRemEnergy" project funded by the Science Fund of Republic of Serbia - Green program focuses on development of phytobuffers for landfill phytoremediation with the use of Short Rotation Woody Crops (SRWC) plantations that can be further used for the biomass for energy. One of the goals of the project is to select most appropriate poplar (*Populus* sp.) and willow (*Salix* sp.) clones through phytorecurrent selection that involves testing of various breeding traits. Physiological parameters serve as a significant contribution to the breeding process aimed to early detection of potential candidates. This study involved testing of the effect of the landfill soils on the photosynthetic processes of the selected poplar and willow candidates. For this purpose, measurements of the gas exchange, chlorophyll content and chlorophyll fluorescence were measured on the tested plants. Obtained results showed that there were differences in the influence of the controlled sources of variation on examined physiological parameters. The effect of clone was significant in all parameters, while the effect of the substrate was not statistically significant in any of measured parameters. However, the effect of interaction Clone×Substrate was significant in intercellular CO<sub>2</sub> concentration (ci), stomatal conductance (gs) and transpiration rate (E), suggesting that water regime of the tested clones showed different response to the tested soils. Some clones showed more "generalist" behavior (380, 107/65/9, and PE19/66), while "specialist" behavior was recorded in clones PE4/68, S1-8, and 79/64/2. On the other hand, there was no significant effect of the tested substrate on the pigments content measured with SPAD meter. Results of this study allowed us to narrow the group of clones for further trails in field conditions.

**Keywords :** clones, net photosynthesis, WUE, transpiration, stomatal conductance, SPAD

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