

DESCRIPTION FOR THE GENERAL PUBLIC

Climate changes are one of the main challenges for the society in coming 10 years. In this context, some of the domestic and international organisations have developed strategies in order to promote exchanging fossil fuels to renewable energy. Using tree plantation with short rotation is a promising tool for decrease of carbon dioxide concentration in the atmosphere and the substrate in production of biomass for industry and energy industry. Nowadays, one of the most popular species used in such plantations is *Paulownia*. *Paulownia* is a fast growing deciduous tree, which is native in China and East Asia. This type includes nine species and several natural hybrids. Important species of this type are *P. albiphloea*, *P. australis*, *P. catalpifolia*, *P. elongata*, *P. fargesii*, *P. fortunei*, *P. kawakamii* and *P. tomentosa*. The species from this type are extremely well-adjusted to wide changes of soil and climate factors, they grow on soil referred to as marginal. The main aim of proposed project is complex analysis of the soil quality in the cultivation of two varieties cross: *Paulownia elongata* and *Paulownia fortunei* (*Paulownia Clon in Vitro 112*). Biological, physical and chemical properties are considered as essential elements shaping the quality and fertility of the soil. The research aim is to analyze the structural as well as function diversity of soil microorganisms. Determination of correlation between biological activity and physicochemical properties of soil is extremely significant. As a part of this project, the analyses of structure and functional content of *Paulownia* leaf microbiome will be performed with utilisation of NGS technique and BIOLOG EcoPlates System. The first plantations of this type of tree in Poland appeared in 2014/2015 and its number is still growing. Due to the lack of information on the influence of *Paulownia* tree plantation on soil environment in temperate climate but also with growing number of planted trees, it is important to perform analyses which aim to determine the quality and condition of soil in *Paulownia* cultivation. The analysis of structure diversity that are the qualitative and quantitative analysis of bacteria population species content are to be performed by modern technique, thenext-generation sequencing of hypervariable fragments of 16S rDNA gene. Functional diversity will be analyzed with the use of BIOLOG (EcoPlates) System, that means that metabolic profile of soil is to be determined (*community level physiological profiles* - CLPP). The analyses of physicochemical properties of soil, including the content of particular chemical element, pH, Eh, TOC and texture are to be performed.