DESCRIPTION FOR THE GENERAL PUBLIC

Nowadays global warming represents one the most serious threat for the humanity. Reducing the concentration of the carbon dioxide in the atmosphere poses difficult challenges that require a joined political, scientific and social effort. Recently, scientists have paid more attention to the natural processes that immobilize carbon in the natural environments. Two thirds of the terrestrial carbon are stored in the soil. Understanding the mechanisms, which govern the carbon deposition in soil could help to develop strategies to manipulate such process in order to increase the soil carbon pool, reducing its concentration in the atmosphere. Plants represent the main door for the carbon entering the soil. Once there, carbon fate depends on the microorganisms that use it as source of food and energy. The quantity of carbon remaining in the soil depends, in part, on the amount, identity and activity of microorganisms that are utilizing it. Plants, beside bringing carbon in the soil, have also a strong influence on the microorganisms living in the soil but many aspects of such interaction are still unknown. In the present project we propose to study different plant assemblages on the Silesian coal mine heaps and the soil microbial communities associated with them in order to gather new information about the mechanisms influencing the carbon storage in the soil. Research on the composition, functioning and activity of microbial communities will be performed with metatranscryptomic analysis. It is advanced molecular technique focused on the isolation of total RNA from soil and its sequencing. Unlike DNA, RNA is present in living cells of microorganisms only, therefore apart their biodiversity, it will enable to recognize which groups of microorganisms are the most important, active ‘players’ associated with dominant plant species and higher carbon quantity in the soil. The results of our study will provide useful information for developing effective strategies to recover post-mining sites as the active carbon sinks improving the landscape and economic values of the region.