Description for the general public

The main goal of the study is comparison of quantity and taxonomic diversity of mycorrhizal symbionts at salt affected area in relation to the different physicochemical properties of soils, including salinity and growing seasons.. The abiotic stress induced by high salinity can inhibit germination of spores and colonization of the plant roots by symbiotic fungi. In effect, it can decrease density and diversity of symbiotic structures formation on the roots of trees. The effect of mycorrhizal fungi in salt stress conditions is hardly known so far and published results analyze mainly herbaceous plants. Therefore, the main aim of the project is to analyze quantity abundance, taxonomic structure and dynamic of mycorrhizal fungi population forming a symbiotic associations with the roots of black alder (*Alnus glutinosa*) which can tolerate a high concentration of salt in the soil. During the realization of the project we will analyze mechanisms responsible for association of mycorrhizal fungi and host plant at salt stress conditions. To this aim we plan to analyze inoculation effect of selected mycorrhizal fungi on growth of black alder seedlings and its potential to phytodesalinisation of soil. The project concern on total mycorrhizal structure of black alder (ectomycorrhizal and arbuscular fungi). We assume that formation of both types of mycorrhizae on the same plant root system, at the same time and in the same hard conditions can help in acclimatization and growth of *Alder* under salt stress. Mycorrhizae is a widespread phenomenon concerned the most terrestrial plants (about 80% plant species). Increased access of mycorrhizal plants to nutrients and water is the first stage of complicated ecosystem which can influence diversity of plants. Moreover, mycorrhizal fungi participate in the carbon cycle, nutrient cycling e.g. nitrogen, phosphorus and affect on stability of soil. Hence, it is important to study mycorrhizae at higher level of organization such as population, communities and ecosystems. Mycorrhizal fungi play an important role in protection of plants against salt stress. In this conditions fungal symbionts can improve nutrient and water uptake, production of antioxidants and osmolites, increase the efficiency of photosynthesis and activity of aquaporins. The increasing problem of salinity in the world needs more information about population structure of mycorrhizal fungi under salt stress, which is important for functionality of these ecosystems.