

## Effect of Biochar on the Growth and Ectomycorrhizal Fungal Community of Japanese Black Pine Seedlings

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**Purpose:** Japanese black pine (*Pinus thunbergii*) is widely planted along coastal areas in Japan and plays an important role for keeping landscape and for preventing Tunami disaster. Since most fine roots of the pine trees were colonized by ectomycorrhizal (ECM) fungi, ECM associations would be necessary for water and nutrients absorption, especially in seedling stage. In recent studies, biochar, which is a charcoal derivative from various plant materials, is expected to be a soil ameliorant improving soil moisture as well as nutrient condition. Thus, the application of biochar might affect ECM fungal communities. In this study, we aimed to clarify the role of soil biotic and abiotic conditions for the growth of pine seedlings. For this purpose, we monitored the growth of the seedlings and evaluated the enzyme activity of ECM fungi under different substrate conditions.

**Method:** Soils collected from a coastal pine forest were sieved with a 2mm mesh, and were divided into two groups, i.e. sterilized or non-sterilized. Both the groups were further divided into with/without ECM fungal inoculation and with/without biochar application. In total, 8 treatments were prepared. After pine seeds were sown in multi-cavity containers, 94 seedlings were monitored and 34 of them were finally examined for biomass. Moreover, a part of the root system was used for mycorrhization, enzyme activity assay and DNA analysis.

**Results and conclusions:** In biochar added treatments, the biomass of seedlings tend to increase compared with control. Biochar applications increased ECM formation rates and the occurrence of whitish ECM roots tended to increased. Based on obtaining results, we discuss how the application of biochar as well as ECM fungi affect the growth of pine seedlings.