

Classification and functional significance of root endophytic fungi collected from Japanese cedar forests in the central Japan

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Purpose: Japanese cedar, *Cryptomeria japonica*, is one of the major planted tree species in Japan. Fine roots of the cedar have an association with arbuscular mycorrhizal fungi. However, limited information is available for other fungal taxa involved. This study aimed to clarify the identity and functional significance of root endophytic fungi associated with the cedar.

Method: Root samples were collected from 7 cedar forests in the central Japan. First- and second-ordered root tips were surface sterilized and then separately incubated on PDA media. Fungi appeared from the tips were sub-cultured and used for DNA barcoding. Obtained DNA sequences were clustered as MOTUs (molecular operational taxonomic units) with a 97% homology and executed for the BLAST search to infer taxonomic identities. One representative strain in each MOTU that appeared from three or more different forests, i.e. 17 strains, were used for following in vitro tests. Each the strain was inoculated to cedar seedlings grown on modified MMN media excluded malt but containing 1%(w/w) glucose. After 3 months, the growth and health condition of the seedlings were measured based on their appearance, above- and belowground-biomass, and photosynthetic activity.

Results and conclusions: In a total of 1650 roots, fungi were endophytically appeared from 34.0% (561 roots). Among the successfully cultured 525 strains, 67.0% (352 strains) were determined DNA sequences which were divided into 79 MOTUs. The order Helotiales was the most dominant taxa. For some strains, fungal inoculation tended to show the increase in seedling biomass compared to the control. Based on these data, we discuss taxonomic traits and the extent of affinities with cedar trees of endophytic fungi.