

## Population structure and genetic recombination of *Racodium therryanum* revealed by new microsatellite markers

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**Purpose:** *Racodium therryanum* is a fungus that causes snow blight to some coniferous species in nursery and plantation in northern area of Japan such as Hokkaido. Since its sexual stage has not been found in Japan, little is known its life cycle. The purpose of this study is to elucidate the population structure of *R. therryanum* in nursery and plantation area and to examine whether genetic recombination events take place in its life cycle.

**Methods:** From the nursery and two plantation areas 10~20 km apart from each other, a total of 133 isolates of *R. therryanum* were collected after the snow melted.

**Results:** They were classified into 70 multilocus genotypes by using seven newly developed microsatellite markers. Two genotypes dominated in the nursery, while many unique genotypes were observed in plantations, indicating that genotypic diversity was lower in nursery. Pairwise  $F_{ST}$  showed the significant genetic differentiation between the nursery and two plantations (0.0405, 0.0629, respectively,  $P < 0.05$ ) though it was not observed between the plantations. This result indicates that the nursery is isolated from plantations, while gene flow occurs among plantation areas. Also, multilocus analysis revealed three lineages which were distributed sympatrically across the nursery and plantations. Linkage disequilibrium analysis indicated the random mating of *R. therryanum* within each lineage.

**Conclusions:** These results suggest the complex population structure and hidden recombination events of *R. therryanum*, even though no sexual stage of this fungus has been observed.