Abstract

[Project Information]

Project Title: Ecophysiological Studies and Real-time Monitoring Technology for Enabling Growth of Endangered Plant Seedlings in in situ Habitats

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[Abstract]

In three nationally rare wild plant species targeted for this study, we successfully identified the factors that had previously inhibited seed germination and those that had hindered the survival of germinated seedlings. We were also able to determine the ″environmental conditions suitable for germination and seedling growth,″ as well as the ″optimal light levels, soil moisture content, soil characteristics, and beneficial fungal communities″ required for the growth of mature individuals. Furthermore, we achieved real-time monitoring from remote locations using satellite communication. This real-time monitoring is expected to be further enhanced through the upcoming introduction of Starlink services by KDDI, which will enable remote transmission of image data and other information. As a result of these achievements, we established an *ex situ* conservation site that covers all 28 genotypes (64 individuals) of *Piper*

postelsianum for which, over the past 20 years, not a single individual had been propagated through Ministry of the Environment–commissioned conservation projects. Seeds produced by these individuals were sown *in situ*, leading to the successful cultivation of 95 individuals from seedlings. In the case of *Pittosporum parvifolium*, 78 individuals are currently being cultivated *in situ*, including 48 individuals surviving for 2–3 years and 30 individuals surviving for 1 year—representing a significantly higher survival rate compared to conventional propagation programs. For *Melastoma tetramerum*, we established a reliable method for the frequent and successful cultivation of seedlings from germinated seeds. This allowed us to consistently produce genetically diverse seedlings, resulting in the successful growth of 30 individuals. Lastly, over the course of three weeks, we worked closely with the active ranger of the Ministry of the Environment's Ogasawara Nature Conservation Office to transfer the techniques for producing and maintaining these seedlings. The project was concluded following a successful handover.