

Keynote Address II

Environmental Stress Management through Mycorrhizal Symbiosis in Horticultural Plants

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Introduction

Arbuscular mycorrhizal fungi (AMF) are known as symbiotic fungi with the effect of promoting host plant growth mainly by enhancing phosphorus uptake through symbiosis. AMF is considered to develop a sustainable ecofriendly strategy to overcome biotic and abiotic stresses in plant production as well as safe agricultural production. As for environmental stress management of biotic and abiotic stresses via AMF, few reports have been demonstrated and the mechanisms still have many unclear points. In this lecture, the events on plant adaptation to biotic and abiotic stresses through AMF symbiosis and the mechanisms in mycorrhizal horticultural plants are introduced.

In asparagus producing regions, early decline and replant problem frequently occur in the fields. These phenomena are known as asparagus decline. Asparagus decline is supposed to be caused by the contribution of both abiotic (allelopathy etc.) and biotic (plant diseases) factors. In this study, PCR-SSCP (single-strand conformational polymorphism) method was established for analyzing biotic factor of asparagus decline in Japan. As the result, *Fusarium oxysporum* f. sp. *asparagi* and *Fusarium proliferatum* were dominant species which lead to asparagus decline. Then, biological control of *Fusarium* crown and root rot was attempted by AMF. Five cultivars of **Mycorrhizal Asparagus Plants** showed tolerance to *Fusarium* crown and root rot, and the increases in followed antioxidative ability, SOD (superoxide dismutase) with high intensity of **Cu-SODs isozyme**, APX (ascorbate peroxidase) activity, contents of polyphenol and ascorbic acids, DPPH (1,1-diphenyl-2-picrylhydrazyl) radical scavenging activity, were closely associated with the tolerance. Generally, if plants get environmental stresses, such as disease, high