

## Isolation of Salt-Tolerant Arbuscular Mycorrhizal Fungi from Sand-Dune Regosol and Its Utilization of Improvement of Salt-Tolerance

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### Summary

Arbuscular mycorrhizal fungi (AMF) colonize 80% of land plants. AMF increase phosphorus (P) uptake of plant by elongation of extraradical hyphae in soil. AMF increase growth of plant under P limiting condition. AMF also increase water uptake of plant and contribute to drought tolerance of plant. Moisture content and salt content are limiting factors of plant growth in arid and semi-arid land. Contribution of AMF to drought and salt tolerance of plant is still unknown. Objectives of this study are (1) to isolate AMF from sand-dune regosol and (2) to clarify effect of AMF inoculation on drought tolerance of plant in order to find possibility of utilization of AMF for revegetation of salt-affected soil.

Sand-dune regosols were collected from sand dune of Yamagata, Tottori, and Ibaraki. Sorghum (*Sorghum bicolor*), Welsh onion (*Allium fistulosum*) and white clover (*Trifolium repens*) were grown in these soils. Spores were collected from soil and were propagated. Length of extraradical hyphae was determined. Welsh onion (*Allium fistulosum*), cowpea (*Vigna unguiculata*) and alfalfa (*Medicago sativa*) were grown in a 500 mL pot. Uninoculated (control), inoculated with AMF *Glomus clarum* and *Gigaspora margarita* plants were prepared. High water stress (40% of maximum water holding capacity), low water stress (50%) and control (60%) treatment were applied 30 days after sowing. Plants were harvested 60 days after sowing. Mycorrhizal colonization and shoot dry weight were determined.

Mycorrhizal colonization were observed in some plants. Eight isolate produced spores. Length of extraradical hyphae ranged from 68.0 to 353.6 mm/g soil. Isolates Y-8 increased shoot growth of *A. fistulosum*. Mycorrhizal colonization was observed in inoculated plants. Shoot dry weight of Welsh onion and cowpea was higher in inoculated plant than uninoculated plant at all water stress levels. Water potential was lower in inoculated plant than uninoculated plants. These results suggest that AM colonization in sand-dune regosol can improve water and salt tolerance of plant.