

TECHNICAL NOTES

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SOIL QUALITY IMPROVEMENT USING MYCORRHIZA INOCULATION AND ITS EFFECTS ON THE PROPAGATION OF CALIFORNIA NATIVE PLANTS

ABSTRACT

This study evaluated the effects of using different amounts of mycorrhiza inoculation in the growing medium used to propagate different conservation plants. This study used endo net arbuscular mycorrhizal inoculum *Glomus intraradices* at three different rates. This study determined that mycorrhizal inoculation provides improved plant performance.

INTRODUCTION

California citizens continue to place greater demands on natural resource areas, which are in need of revegetation or restoration. The costs associated with the propagation and establishment of California native plant materials can be very high and improved methods are needed. This study evaluated the effects of using mycorrhizal inoculation as a means of improving California native plant propagation, performance and vigor, which will aid in California native plants' ability to successfully compete with invasive species.

METHODS AND MATERIALS

A randomized block design was used with three treatments, one control and three replications. 'Duro' California buckwheat - *Eriogonum fasciculatum*, 'Rio' beardless wildrye - *Leymus triticoides*, and LK115d Purple Needle Grass - *Nassella pulchra*, were propagated on March 15, 2000 using ten seeds per 3.785 liter (one-gallon) container. Each container contained 451.7 grams of growing

Prepared by David A. Dyer, Manager, Lockeford Plant Materials Center, Lockeford, California. Reviewed by: Dr. Ted St. John, BioNet LLC, Marina, CA; Dale Darris, PMC Agronomist, Corvallis, Oregon; Mike Hubbs, Agronomist, Soil Quality Institute, Auburn, Alabama; Loren St. John, PMC Team Leader, Aberdeen, Idaho; Bruce Munda, Plant Resource Specialist, Tucson, Arizona; Mark Pater, PMC Coordinator, Tucson, Arizona.

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medium and was placed in the Lockeford PMC greenhouse. The growing medium contained 80% Canadian sphagnum peat moss and 20% other: perlite, vermiculite, dolmitic and calcitic limestone and a wetting agent.

The Lockeford PMC greenhouse did not use artificial lighting and the cooling system was activated at 76 degrees F during the 115-day plant growth period. Twelve grams of Osmocote 18-6-12 slow release fertilizer was applied to each container two weeks after emergence. Three different rates of EndoNet arbuscular mycorrhizal inoculum *Glomus intraradices* were used: .9 gram, 1.8 gram and 2.7 gram. On 6-15-2000 the irrigation system in the greenhouse was turned off to simulate a water stressed environment. All the plants in the three treatments and control were evaluated on July 10, 2000 for size and vigor.

RESULTS AND DISCUSSION

Using high peat content nursery growing media that contain no soil have in some cases prevented mycorrhizal colonization, even though general microbial activity was high (Danielson et al. 1983). There is a correlation with P content of various media, including peat and the suppression of mycorrhizal activity (Biermann and Linderman, 1983). If P is the inhibitory factor, it may be leached out with the passage of time (Graham and Timmer 1985). Good results using a peat medium have been reported by other researches (i.e. Powell and Santhanakrishnan 1986).

'Duro' California buckwheat had excellent vigor with the 1.8-gram treatment and poor vigor with the 0.9-gram treatment. The 1.8-gram treatment provided substantial vigor improvement over the control treatment and plant water stress was not apparent. The 0.9-gram treatment and control exhibited signs of water stress.

'Rio' beardless wildrye with the 2.7-gram treatment showed excellent vigor and 17.78 cm more height than the control. Plant water stress was not apparent with the 2.7 gram treatment.

LK115d Purple Needle Grass with the 2.7-gram treatment also showed excellent vigor, 7.62 cm more height than the control and exhibited no apparent signs of plant water stress.

CONCLUSION

Mycorrhizal inoculum was successful in increasing California native plant vigor, growth height and drought tolerance. Mycorrhizal inoculum has the potential to increase California native plant competition and establishment over invasive and non-native plant species.

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Table 1. Evaluation of plants by Treatments.

<u>Variety</u>	<u>Treatment</u>	<u>Average Height (cm)</u>	<u>Average Vigor*</u>
'Duro'	0.9	13.46	7.7
	1.8	20.32	1.3
	2.7	21.08	4.7
	Control	20.32	6.3
'Rio'	0.9	66.04	5.0
	1.8	69.34	4.0
	2.7	93.98	2.0
	Control	76.2	4.0
LK115d	0.9	31.24	5.0
	1.8	35.56	4.0
	2.7	44.96	2.0
	Control	37.34	6.0

*Vigor Ratings: 1= Excellent, 9= Poor