

IMPACT OF INOCULATION WITH PLANT MATERIAL ON PLANT DEVELOPMENT; GREENHOUSE TESTS¹

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Abstract: This study tests the hypothesis that employing site-specific native endophytic microbial consortia would lead to microbial consortia more likely to adapt to the local conditions, persist after inoculation, and enhance plant fitness. Three treatments were used to test this hypothesis: Fresh seed (Treatment A), dehulled and surface sterilized seed (Treatment B), and dehulled, surface sterilized seed with container inoculated with 1 gram of ground native plant material (Treatment C). All treatments were carried out in soil conditions representative of coal mine reclamation areas located in northwestern New Mexico. Mining spoil comprised the bottom 13 cm of the planting containers and was overlaid with 23-28 cm of topsoil. Nine plant species commonly used for revegetation at the mine site were considered for inclusion in the study. All tests were carried out in triplicate. Due to differences in germination potential only three of the original nine species were utilized in the study: *S. airoides*, *B. gracilis* and *P. jamesii* produced statistically complete datasets across all treatments and were used for analysis. Plant growth was measured and documented over 5-7 months after which destructive harvesting was conducted to measure root development and soil chemical and functional parameters. Inoculation with site-specific plant material resulted in increased plant height and root growth for *S. airoides* and was deleterious to growth rates in *H. jamesii*. Results suggest that while non-specific endophytic inoculation may have an effect, it is highly plant species dependent. Both beneficial and potentially facultative pathogenic microbes likely interact in improving or impeding plant growth.

Additional Key Words: Reclamation, revegetation, topsoil.

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