

AROUND THE WORLD NURSERY INOCULATIONS AND CONIFER ESTABLISHMENT USING *RHIZOPOGON* MYCORRHIZAL FUNGI

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Rhizopogon is a large genus mycorrhizal fungi of particular importance to the Pinaceae. *Rhizopogon* species occur in both young and old forests, in diverse habitats and are present on every continent but Antarctica. This ecological amplitude was recognized early in the 20th century when *Rhizopogon* species were observed as dominant ectomycorrhizal fungi in exotic pine plantations. Establishing *Rhizopogon* in nursery inoculations at international nurseries has greatly benefited the establishment of North American conifer species around the world.

Rhizopogon are common, but often unnoticed, members of the mycorrhizal community where Pinaceae species are indigenous. *Rhizopogon* occurs naturally across the United States, in Mexico, Japan, China, Europe, and North Africa. Many new species in Europe and many other species in North America remain undescribed. Where conifers are not native (for example Australia, New Zealand, large areas of South America, and numerous islands), *Rhizopogon* species have followed their introduced conifer hosts into these exotic locations, often becoming dominant members of the introduced ectomycorrhizal flora. Numerous factors make *Rhizopogon* a prime candidate for nursery inoculation program both

nationally and internationally. Functional activities that benefit conifer outplanting performance include:

- *Rhizopogon* defends against diseases
- *Rhizopogon* is tolerant of a broad pH range
- *Rhizopogon* has high levels of enzyme and hormone activity benefiting nutrient acquisition
- *Rhizopogon* can utilize organic forms of nitrogen
- *Rhizopogon* protects seedlings against moisture stress
- *Rhizopogon* promotes successful conifer establishment and growth

Consequently, *Rhizopogon* has been the focus of considerable application research in forestry. The ease, viability and effectiveness of nursery spore inoculation is well documented. The low-cost nature of spore inoculation and the improved outplanting performance of *Rhizopogon* inoculated seedlings is driving increased use of *Rhizopogon* in forestry practice. Nearly 200 scientific papers have been published on *Rhizopogon* and this important body of information is now being put to practical use.