



***Serendipita* fungi from Australian orchids as possible barley root endophytes.**

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Serendipita (syn *Piriformospora*) *indica* has been shown to be an effective root endophyte, plant growth promotor, and inducer of disease resistance in a number of plant systems. Australia is rich in *Serendipita* species which have a mycorrhizal association with orchids. The aim of this study is to determine whether *Serendipita* orchid mycorrhizal fungi are able to colonize barley roots as endophytes. We tested the ability of 14 *Serendipita* isolates representing eight species or operational taxonomic units, from five orchid species to colonize barley root cells. Surface sterilized seed of barley variety Skiff was added to tissue culture jars containing colonies of each fungus on Murashige and Skoog medium. Root colonization by *Serendipita* was microscopically assessed after 60 days. The formation of microsclerotia, monilioid cells, chlamydospores, and mycelium within barley roots was observed for all *Serendipita* species, indicating successful colonization. Preliminary analyses suggest variation among *Serendipita* species at forming endophytic associations with barley. Future studies will include testing these fungi for their ability to promote barley growth, induce phosphorus uptake, and promote disease resistance. This research sheds light on the potential of utilizing orchid mycorrhizal *Serendipita* species as beneficial endophytes in barley cultivation, with potential applications in sustainable agriculture.

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