Exploring seed microbiomes to develop bespoke microbial amendments for enhancing revegetation success of underutilised native species.



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Native seed storage is essential for ensuring a reliable seed supply for ecological restoration, yet growing evidence suggests that the drying, handling, and storage practices required to maintain seed viability may also alter seed-associated microbial communities that contribute to germination and early plant performance. Support from the Australian Flora Foundation Malcolm Reed Research Grant enabled us to investigate how commercial seed supply practices influence the seed microbiomes of two Australian native grasses and whether beneficial seed-associated bacteria could be used to improve the performance of stored seed. We found that commercially stored seed harboured bacterial communities that differed substantially from freshly collected seed. However, a complementary storage experiment showed that storage alone had relatively little effect on seed bacterial communities over 12 months, suggesting that other stages of the seed supply pathway, including drying, processing, handling, and provenance, are likely to have a greater influence on native seed microbiomes. We also demonstrated that biopriming stored Microlaena stipoides seed with bacteria isolated from fresh seed of the same species significantly improved germination, whereas bacteria from other grass species produced much weaker responses despite exhibiting similar plant growth-promoting characteristics. These findings identify the native seed supply pathway as an important focus for future research and provide a foundation for developing microbial technologies to improve native seed performance and ecological restoration outcomes.