

Diversity of endophytic fungi in live and dead leaf sheaths of *Brachypodium sylvaticum* infected with stroma-forming and asymptomatic *Epichloë* endosymbionts

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The fungal endosymbionts of the genus *Epichloë* (Clavicipitaceae, Ascomycota) systemically infect the aerial parts of certain cool-season grasses in the sub-family Pooideae. *Epichloë* is a monophyletic genus that includes anamorphic (asexual) and teleomorphic (sexual) species. Asexual *Epichloë* species transmit vertically via host seed while sexual species can transmit horizontally between hosts, and some species can simultaneously transmit both vertically and horizontally. With respect to the sexual reproductive lifecycle, *Epichloë* form external stromata that prevent the development of inflorescences and seed production of the host. Recent studies reported that the presence of *Epichloë* in both live and dead grass leaves can affect the leaves composition of non-systemic endophytes. However, the effects of the sexual reproductive cycle, particularly the presence of *Epichloë* stromata on the diversity and functional groups of non-systemic endophytes are yet to be investigated. Assessments were made of the fungal diversity in live and dead leaf sheaths of *Brachypodium sylvaticum* plants that were endophyte-free or colonised by *Epichloë sylvatica*, a species that can be genetically differentiated

into sexual and asexual subpopulations by DNA metabarcoding. The species richness of non-systemic endophytes and those that were functionally assigned by the FungalTraits database to litter saprotrophs and plant pathogens was greater in live plants than dead plants. In live grass plants, the species richness of non-systemic endophytes, and those that were functionally assigned to litter saprotrophs and plant pathogens, was significantly greater in individuals exhibiting stroma than in asymptomatic plants colonised by *Epichloë* and those that were endophyte-free. The composition of non-systemic endophytes that were functionally assigned to litter saprotrophs was significantly different between stroma-forming plants vs asymptomatic and endophyte-free plants, whereas such differences were not significant in the composition of non-systemic endophytes that were functionally assigned to plant pathogens. These results suggest that the presence of *Epichloë* stroma on *B. sylvaticum* affects the diversity of saprotrophic fungi and these could potentially alter ecosystem processes such as decomposition of dead plant tissues in soil.