

Use of endophytic fungi in turfgrasses: Difficulties in delivery to the market

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The presence of endophytic *Epichloë* fungi for turf performance of ryegrass (*Lolium* spp.) and fescue (*Festuca* spp.) species were first reported in the 1980s. Various *Epichloë* endophyte species and strains have been shown to produce a series of different alkaloids that impact insect pests and grazing animals, have some effects on nematodes and diseases, and influence plant stress tolerance. Over 40 insect pests and diseases have been documented as responding to endophyte infection.

Epichloë fungi that are important in turf are seed transmitted. The endophyte transmission to the seed is controlled by the levels found in the parent plants. Later generations depend on how well the endophyte is maintained during seed production. Endophyte viability in seed lots can drop during storage and transport, especially when stored under high temperatures and humidity. Endophyte growth into seed during seed production can be influenced by the weather, use of fungicides and growth regulators, and the timing of combining after swathing. In the United States, the endophyte infection levels in breeders' seed of the cultivars used in the National Turfgrass Evaluation Program trials have been reported but currently, no standards exist for labeling cultivars delivered with high endophyte levels. Without suitable protocols and standards, challenges exist in delivering high endophyte infection levels to tall fescue (*Festuca arundinacea* Schreb.), ryegrass, and fine fescues. Insuring high levels of endophyte requires expense and monitoring so the market would need to establish standards and consumers would need to be willing to pay for infection.