**Abstract**

We examined arbuscular mycorrhizal (AM) and dark septate endophyte (DSE) fungal association in 50 south Indian grasses from four different sites. AM fungal diversity was also compared among the different sites. Forty-four of the 50 grasses examined had AM association and dual association with DSE fungi occurred in 25 grasses. We report for the first time AM and DSE fungal status in 23 and 27 grasses respectively. *Arum*-type AM morphology was the dominant occurring in 21 grasses with typical *Paris*-type colonization occurring in 6 grasses. AM morphology is reported for the first time in 35 grasses. Over the different sites, spore density in the soil ranged from 5–22 per 100 g air-dried soil. Spores of 11 AM fungal taxa were isolated from the soil samples of grasses of which nine belonged to *Glomus*, one to *Acaulospora* and one to *Scutellospora*. No significant relationship existed between AM fungal colonization and spore numbers. Species richness was high in site II and *Glomus aggregatum*, *Glomus viscosum* and *Glomus mosseae* were most frequent species at different sites. Overall species diversity indices (Simpson index, Shannon-Weaver index, species equitability index) differed significantly between sites.