

Supplementary Data Set S2. Functional Categorization of *Epichloë* ORFs

On several occasions our analyses required us to group together *Epichloë* ORFs with similar functions. For this, we initially identified likely functions of individual ORFs and then defined a small number of categories to which these functions could be assigned.

For Figures 3 and 4 we assigned *Epichloë* ORFs to categories as follows: “?”, no good BLAST hits; “ ? cons”, good BLAST hits to proteins of unknown functions; “interact & devel”, interaction with plant, including protection from plant defenses (ABC drug transporters), stress protection, surface molecules involved in recognition, protection from reactive oxygen species, development including morphogenesis, cell cycle, cytoskeleton organization; “macrom struct”, tubulin, actin, packaging and repair of DNA, membrane organization, cell wall synthesis, ribosomal proteins, woronin body proteins; “metab”, metabolic reaction, such as amino acid metabolism, fatty acid metabolism, respiration, fermentation; “nutraccq”; breakdown of plant biomass and nutrients (sugars/ amino acids/ peptides transporters, response to availability of nutrients); “protect”, involved or possibly involved in the synthesis of molecules known to protect infected plants from herbivory; “protsynth”, protein synthesis including transcription, mRNA processing, glycosylation, protein export, ubiquitination and amino acid biosynthesis; “sign”, protein with regulatory functions including receptor kinases. Supplementary Data Set S3 shows, for individual ORFs, the category to which they have been assigned.

For Fig. 5 we inferred roles of *Epichloë* ORFs in nuclear DNA replication based on significant similarity with gene models in the *E. festucae* E2368 genome, for which a role in nuclear DNA replication could be confidently predicted. Blast2 GO either (i) mapped them to GO-process: DNA replication and GO-component: nucleus and/or (ii) assigned them a name signifying a role in nuclear DNA replication (replication licensing factors, DNA polymerases alpha and epsilon, DNA checkpoint mediator). In addition this function prediction was confirmed by a BLASTX hit with E=0 to a fungal gene annotated to have this function. The ORFs are marked in Supplementary Data Set S3 with the category label *nuc. DNA replic* and listed separately in Supplementary Data Set S15.