

## **Description of Additional Supplementary Files**

File Name: Supplementary Data 1

Description: Information of 34 sexual stage-specific conserved (SSC) genes.

File Name: Supplementary Data 2

Description: Amino acid mutations of FgTad3 and defective phenotypes in the ascospore progeny of the TR-FgTAD3 strain.

File Name: Supplementary Data 3

Description: Strains used in this study.

File Name: Supplementary Data 4

Description: Primers used in this study.

File Name: Supplementary Data 5

Description: Information of Illumina DNA- and RNA-Seq data used in this study.

File Name: Supplementary Data 6

Description: Information of Ame1 orthologs used for phylogeny.