**Supporting Information**

**Figure 1: Distribution of genes under diversifying selection and predicted orthologies for the *F. verticillioides* genome.** A Circos plot is shown which visualizes the *F. verticillioides*chromosomes as merged supercontigs with ticks in kilobase (Kbp) units. The following bands are visualized: (I) Line plot of ratios in 50 Kbp bins, (II) a scatter plot and heat map of genes with more than two orthologs that are predicted to undergo site specific diversifying selection using CODEML, and (III) a heat map that visualizes regions for which no ortholog information is available in dark blue.

**File 1: MEME motif results for the [SG]-P-C-[KR]-P proteins**

**File 2: List of pathogen-associated genes for *F. graminearum* and *F. oxysporum f. sp. lycopersici* that are predicted to undergo site-specific diversifying selection.**

**File 3: Diversifying selection prediction results for *F.* graminearum, F*. oxysporum f. sp. lycopersici* and *F. verticillioides*.**