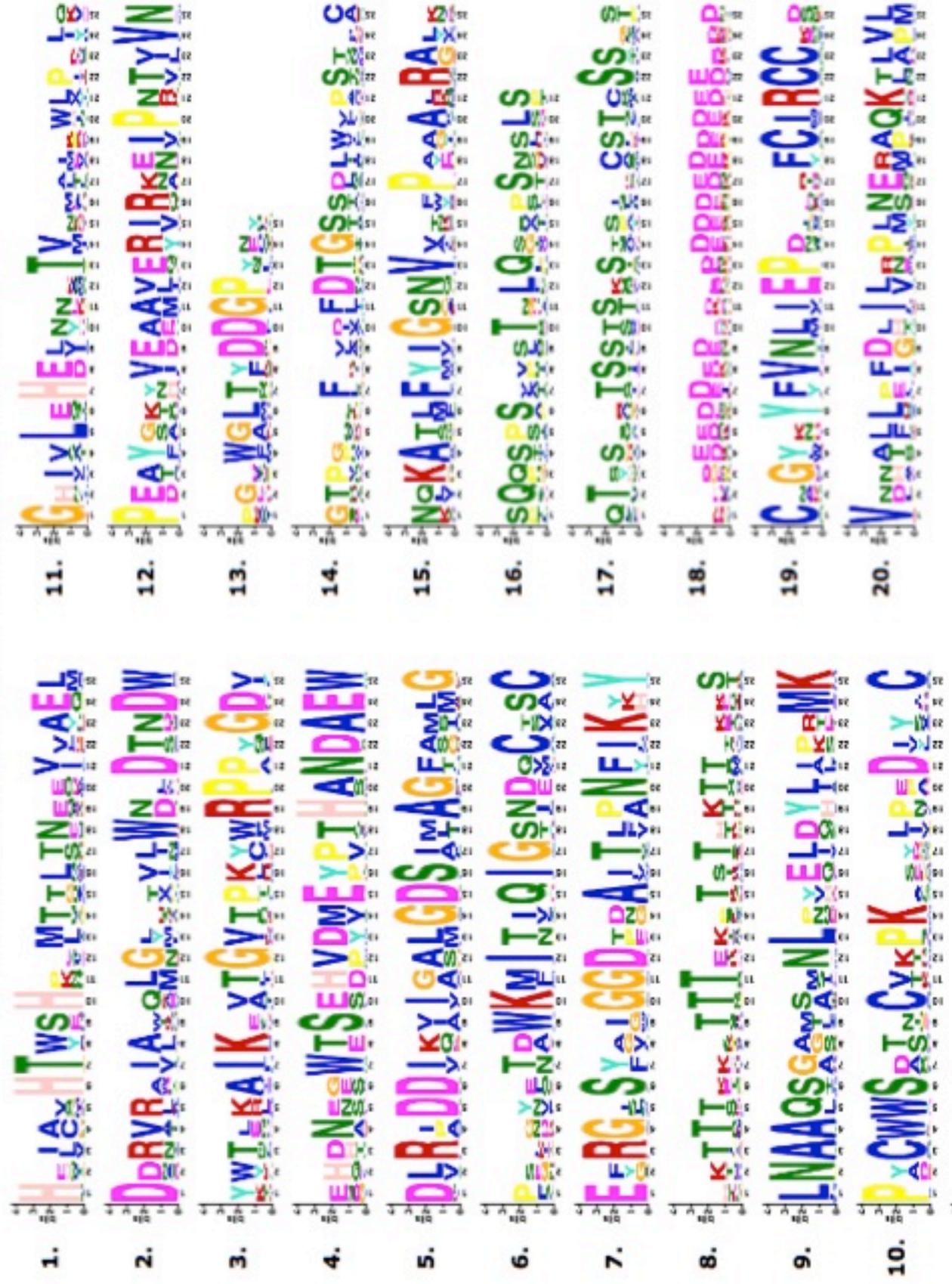


Figure S1

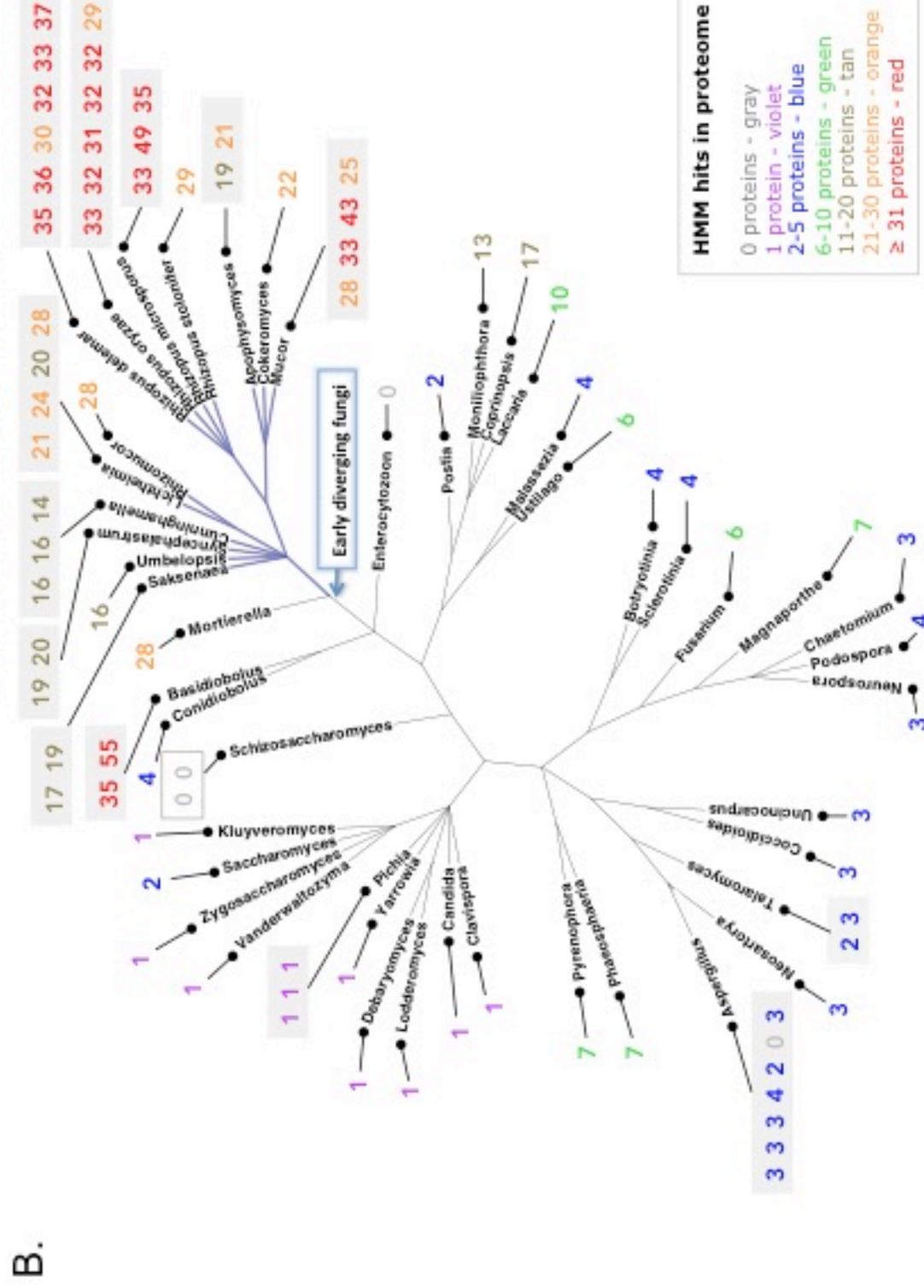
Logos for top 20 motifs identified using MEME



Please refer to Supplementary Table S3 for information about individual motifs.

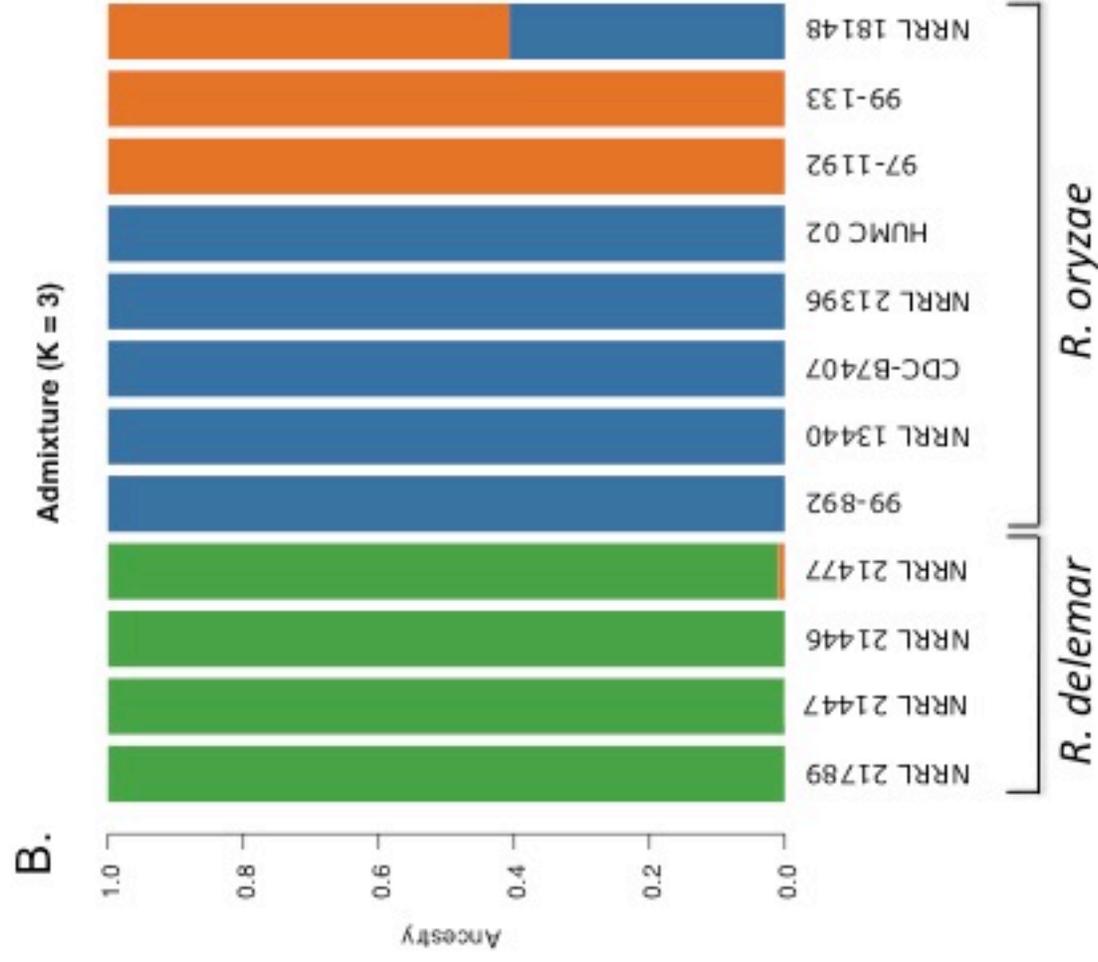
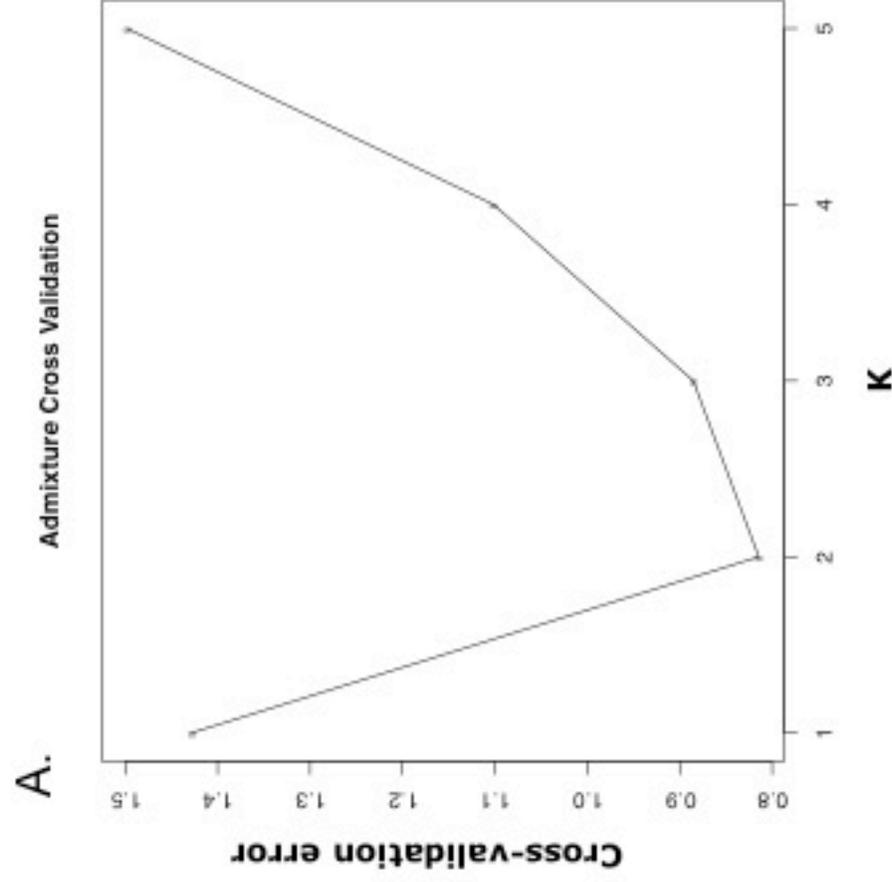
Supplementary Figure 1. Sequence logos for the 20 most significant motifs identified by our MEME search. Y-axis indicates information content (bits). The numbers refer to motif numbers in Supplementary Data 3 which contains information on individual motifs.

Figure S2



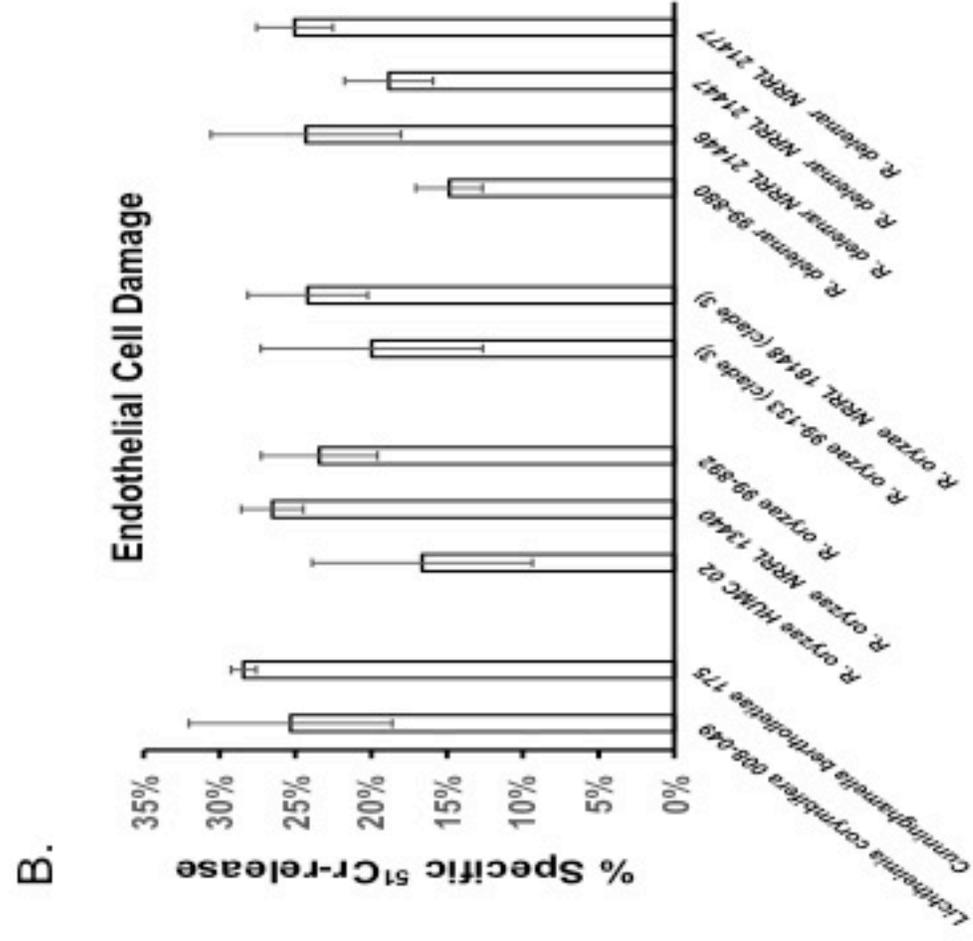
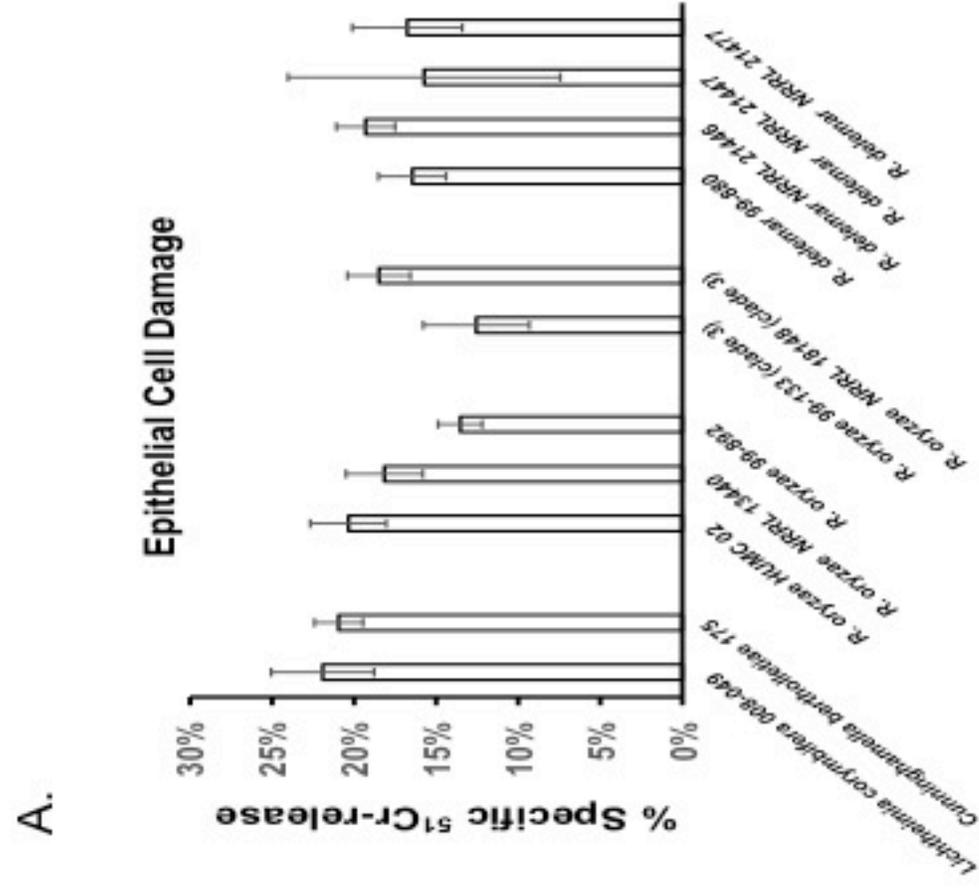
Supplementary Figure 2. Expansion of chitin deacetylases in Mucorales. A. A putatively secreted chitin deacetylase (IGS-99-880.mRNA.2669.1-Protein) and 37 paralogs were aligned from *Rhizopus delemar* 99-880 and a hidden Markov model (HMM) was built. **B.** A total of 48 divergent fungal genera were searched with the HMM. Number(s) pointing to a given genus represent the number of proteins hitting the model for a species within that genus; multiple numbers for a single genus reflect multiple species sampled.

Figure S3



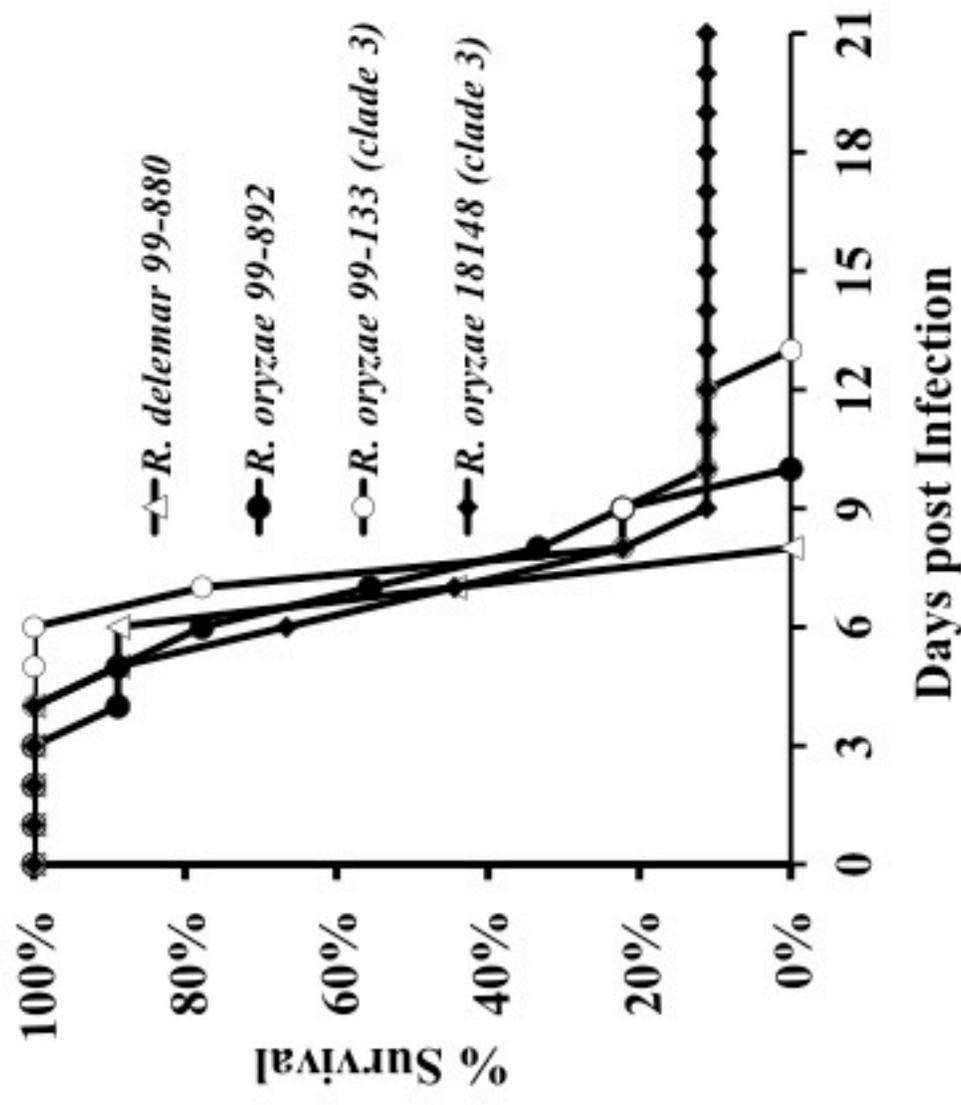
Supplementary Figure 3. Additional Support for Admixture. A. The cross-validation errors as a function of model. The K=2 model had the lowest cross-validation error and was therefore used in the primary analysis **B.** Population structure inferred using the program Admixture using the K=3 model. Values represent fraction of population ancestry denoted by colors: green (*R. delemar*), blue (*R. oryzae*), orange (*R. oryzae* clade 3).

Figure S4



Supplementary Figure 4. Damage of A549 airway epithelial cells (A) and human umbilical vein endothelial cells (B) caused by representatives of Mucorales investigated in this study. Damage to epithelial cells was carried out for 24 h, while endothelial cell injury was studied at 4 h. No clear differences in damage were observed. Results are the median \pm interquartile range; n=6.

Figure S5



Supplementary Figure 5. *In vivo* infection with *R. oryzae* and *R. delemar* isolates. Survival of mice (n=9 per group) infected intratracheally with 2.5×10^5 spores of selected *Rhizopus* strains from each clade described in Figure 3. Confirmed delivered inoculum to the lungs are 2.5×10^3 for *R. delemar* 99-880, 4.0×10^3 for *R. oryzae* 99-892, 3.3×10^3 for *R. oryzae* 99-133 (clade 3), and 2.8×10^3 for *R. oryzae* 18148 (clade 3). $P > 0.05$ versus all groups by Log Rank test.