Supplementary Table 1

Genotype	p > F		
	Genotype	**Environment**	**Genotype X Environment**
ste7Δ	0.0784	<0.0020*	0.0005*
mat2Δ	0.0723	0.0027*	0.1439
spo11Δ	0.5405	<0.0001*	0.8091

Supplementary Table 1. **Effect of genotypes and environment on competition.** 2-factor ANOVA was used to analyze the effect of genotype and the environment on the outcomes of the competitions. (*) represents significant deviations.

Supplementary Table 2

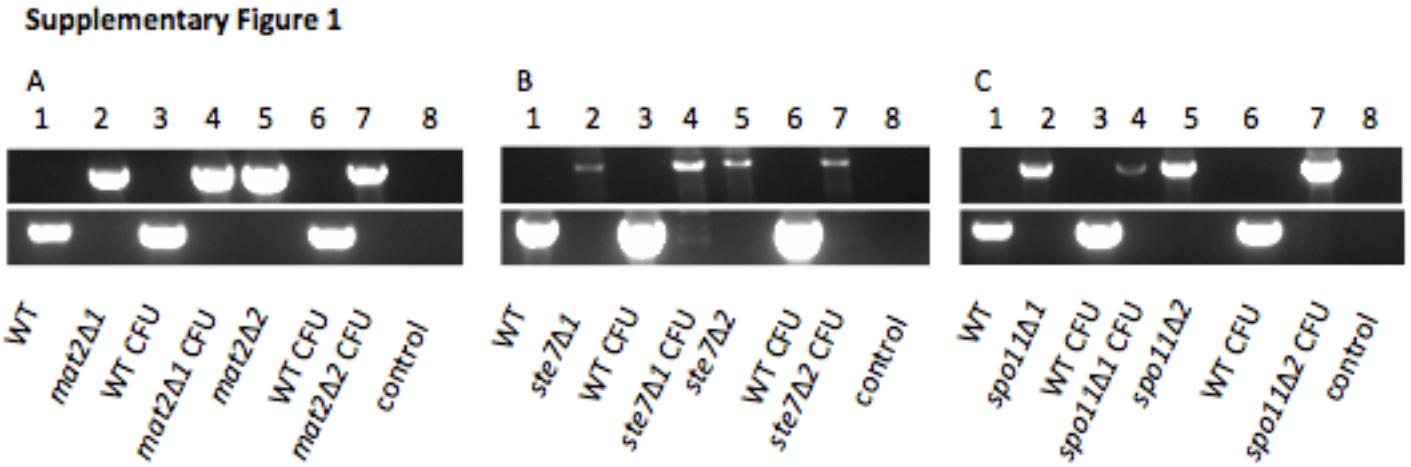
Competing genotype	p-value YPD	MS	V8
ste7Δ1	<0.0001*	0.0466*	<0.0001*
ste7Δ2	<0.0001*	0.0677	<0.0001*
mat2Δ1	<0.0001*	0.0118*	<0.0001*
mat2Δ2	0.4123	0.1776	<0.0001*
spo11Δ1	<0.0001*	0.1461	0.0022*
spo11Δ2	<0.0001*	0.3458	0.0106*

Supplementary Table 2. **Significance testing for the deviation from equality (50% WT).** The binomial two sample proportion test was used to assess the deviation of the observed proportion of wildtype from the equality (50%) expected under the null hypothesis. p-values are provided for the observed proportions at the center of the competition spot. (*) represents significant deviations.

Supplementary Table 3

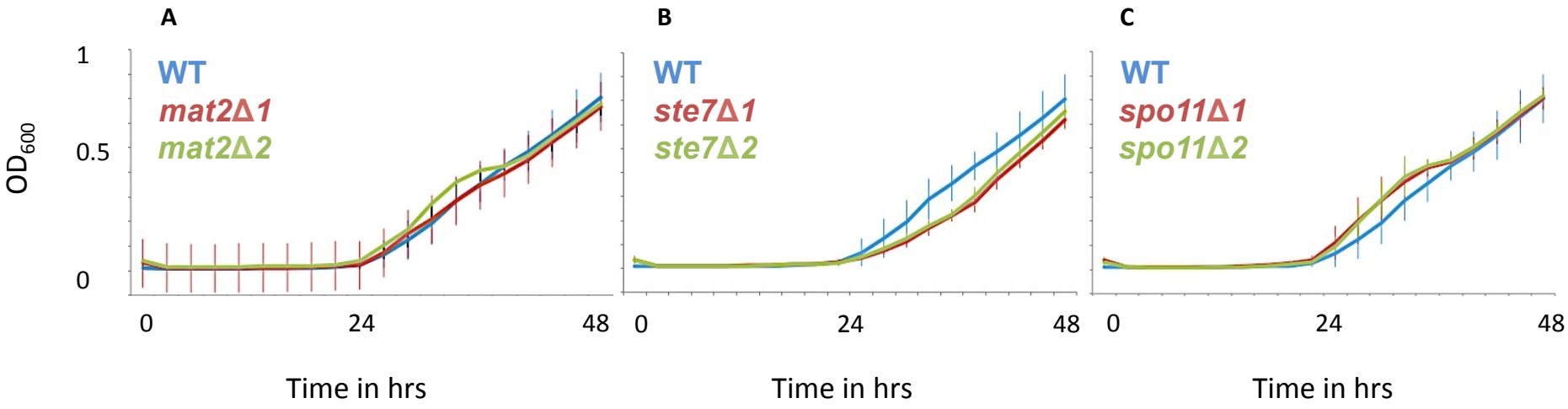
PCR verification	Primer
*ste7*Δ	JOHE14073 JOHE15272
*mat2*Δ	JOHE14087 JOHE15187
*spo11*Δ	JOHE15249 JOHE15250
NAT^R cassette	M13F M13R JOHE21081
RT-PCR	**Primer**
GPD1	XW129 XW130
MFα pheromone	JOHE24434 JOHE24435

Supplementary Table 3. Primers used for PCR verification and RT-PCR.



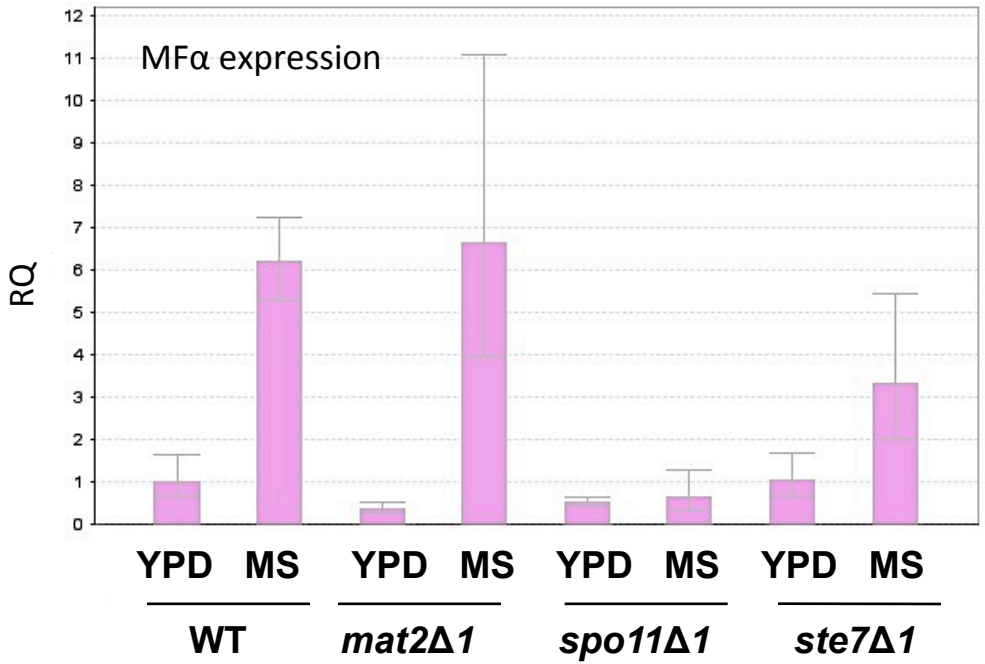
Supplementary Figure 1. PCR verification of NAT^R marker and gene deletions. (Top panel) NAT^R and (Bottom panels) *MAT2* (A), *STE7* (B) and *SPO11* (C). Each panel shows strains in the following order: XL280 WT, Mutant 1, WT CFU, NAT-R CFU from competitions with mutant 1, Mutant 2, WT CFU, NAT-R CFU from competitions with mutant 2, negative control. As expected, only XL280 WT and WT CFU randomly selected from outcome of competitions have the genes intact and only mutants have the NAT cassette used to replace the genes.

Supplementary Figure 2



Supplementary Figure 2. Growth curve assays. (A) *mat2*Δ; (B) *ste7*Δ; (C) *spo11*Δ. OD_{600} was measured for 48 hrs at room temperature using the Tecan-Sunrise microplate reader in YPD liquid medium.

Supplementary Figure 3



Genotype	p-value	
	YPD	MS
mat2Δ	0.07	0.58
spo11Δ	0.11	0.0017*
ste7Δ	0.90	0.08

Supplementary Figure 3. Analysis of pheromone expression. Expression of the MFα pheromone was compared between YPD and MS agar media for WT and the genotypes *mat2*Δ*1*, *ste7*Δ*1*, and *spo11*Δ*1.* Error bars represent standard deviations based on three replicates. The adjoining table provides p-values based on pairwise t-tests used to compare expression levels between the wildtype and each mutant in the respective media.