

Weather conditions

The 2015 growing season experienced receiving continued and above average rainfall during flowering period. The average flowering date was May 20th. The amount of precipitation in Lincoln research was 2357 cm from May 1st to June 5th while normal precipitation is 11.176 cm during the reported period. Environmental conditions were quite conducive for FHB infection and development and 2015 was one of the worst growing seasons for FHB.

Phenotyping

The phenotyping or visual evaluation of FHB was done in the field 18 days after flowering. Susceptibility to FHB (S_FHB) was visually scored on 90 selected random heads per plot based on a scale of 1-10 where 1 is resistant and 10 susceptible [15].

DNA extraction and genotyping

DNA was extracted from the leaves of 53 genotypes using the BioSprint 96 automatic DNA extractor. The DNA concentration was diluted at 50 ng/ μ l in sterile distilled water to be used in KASP-SNP PCR reaction. All samples were arrayed in a 96 well plate. A 10 μ l reaction with 5 μ l DNA from each sample was mixed with 5 μ l KASP reaction mix including a 0.14 μ l of *Fhb1* assay mix (LGC Genomics).

An *Fhb1* KASP marker (wMAS000009) was ordered from LGC-Genomics, Middlesex, UK. Thermal cycling conditions were 94°C for 15 min, followed by 10 cycles of touchdown PCR: 94°C for 20s, 65-57°C for 60 s (dropping 0.8°C per cycle), followed by 26 cycles of regular PCR: 94°C for 20s, 55°C for 60s. The plate of samples was read by FLUO star Omega fluorescent. To determine the absence or presence of the *Fhb1* gene, the allele G (presence) was labeled with

environment. Screening genotypes for FHB genes is the most effective way for improve FHB in wheat. The KASP technology provides reliable and accurate results to detect the target genes. This technology can be used for the marker-assisted selection by determining the

characterization of genotype based on the genotypic level. The three wheat genotypes having *Fhb1* gene can be integrated in breeding program to improve FHB resistant in winter wheat.

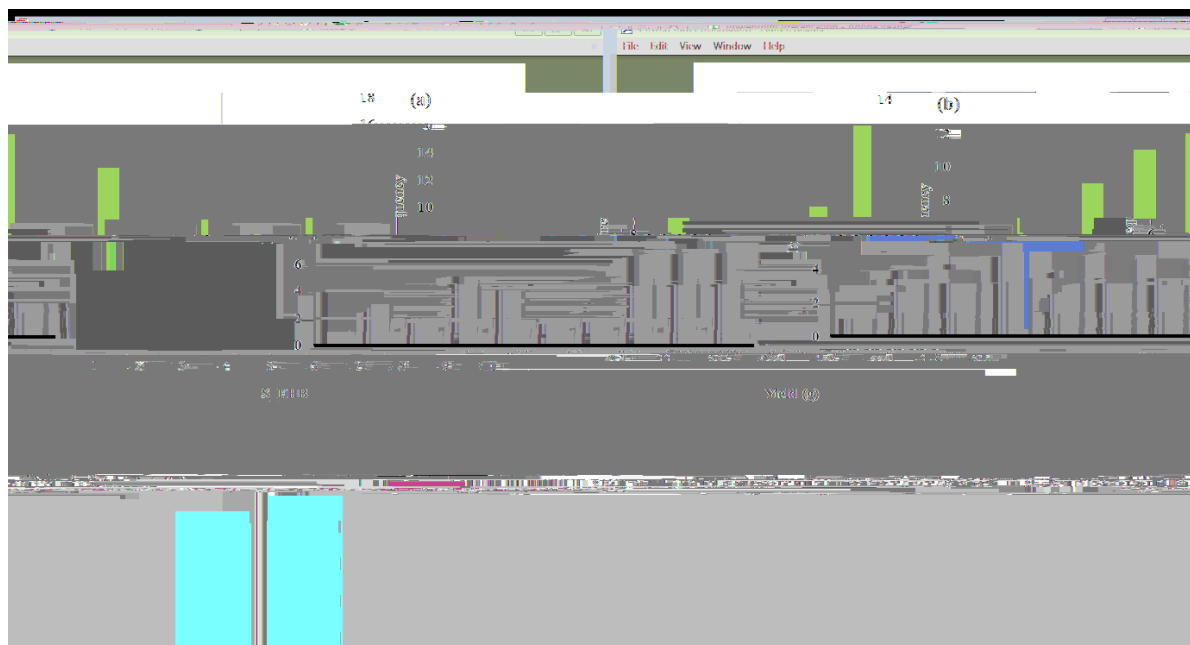


Figure 1: Phenotypic variation between genotypes in FHB index (a) and yield/plot (b).

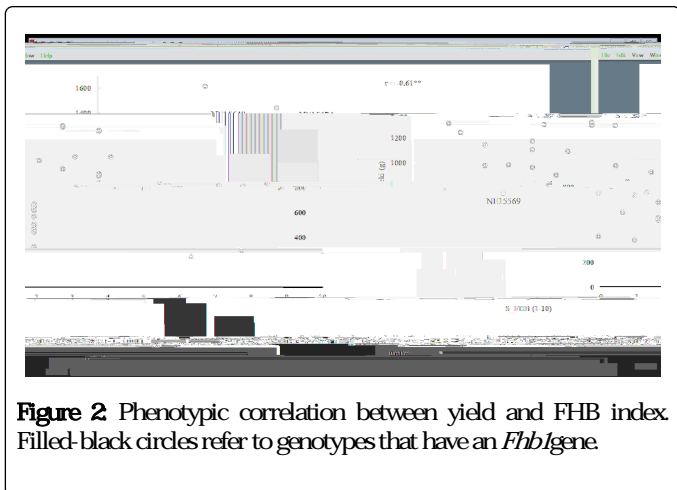


Figure 2 Phenotypic correlation between yield and FHB index. Filled-black circles refer to genotypes that have an *Fhb1* gene.

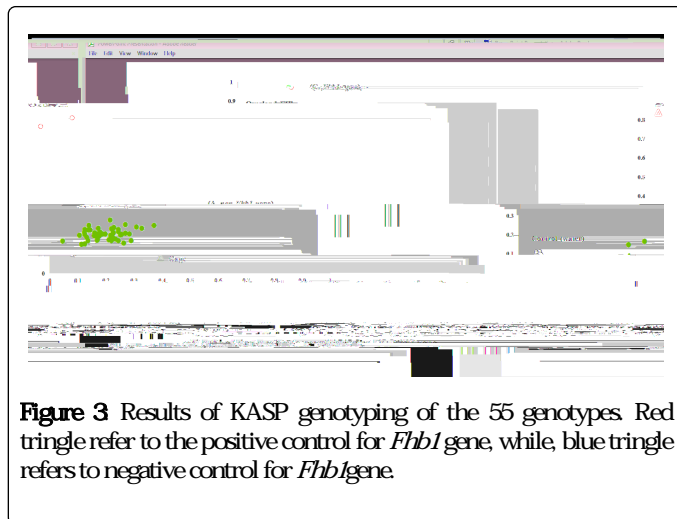


Figure 3 Results of KASP genotyping of the 55 genotypes. Red triangle refer to the positive control for *Fhb1* gene, while, blue triangle refers to negative control for *Fhb1* gene.

