Genome-Wide Association Study for Identification and Validation of Novel SNP Markers for Sr6 Stem Rust Resistance Gene in Bread Wheat

- Amira M. I. Mourad, Ahmed Sallam, Vikas Belamkar, Stephen Wegulo, Robert Bowden, Yue Jin, Ezzat Mahdy, Bahy Bakheit, Atif A. El Wafaa, Jesse Poland and Peter S. Baenziger

Abstract:

Stem rust (caused by Puccinia graminis f. sp. tritici Erikss. & E. Henn.), is a major disease in wheat (Triticum aestivium L.). However, in recent years it occurs rarely in Nebraska due to weather and the effective selection and gene pyramiding of resistance genes. To understand the genetic basis of stem rust resistance in Nebraska winter wheat, we applied genome-wide association study (GWAS) on a set of 270 winter wheat genotypes (A-set). Genotyping was carried out using genotyping-by-sequencing and ∼35,000 high-quality SNPs were identified. The tested genotypes were evaluated for their resistance to the common stem rust race in Nebraska (QFCSC) in two replications. Marker-trait association identified 32 SNP markers, which were significantly (Bonferroni corrected P

Published In:

Frontiers in Plant Science , NULL , NULL