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Identification of Related SNPs through GWAS by Comparing the Heading Date between Yesan and Jeonju

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[Introduction]

The heading date of wheat significantly affects its quality and yield. The heading date refers to the time when wheat forms ears and becomes harvestable after completing its growth. In Korea, rice planting and the use of double-cropping cultivation environment are applied to maximize productivity and efficiency. As the heading date is delayed, wheat quality and yield decreases, which may affect rice planting timing. We aim to identify the heading date of wheat core collection cultivated in two regions in Yesan and Jeonju, selecting early heading accessions, and explore associated SNPs to contribute to the domestic wheat industry.

[Materials and Methods]

We investigated the heading date of the wheat core collection in the experimental fields of each Kongju National University and National Institute of Crop Science, RDA in 2019 and 2022, respectively. Since the sowing time was different between the two regions, the first heading accession was scored with 2 points, and the basic reference date was scored with 1 point. The basic date was defined as the date immediately before the first heading date. The basic dates were recorded as Apr. 16, 2019 / Apr 14, 2022 in Jeonju, and Apr. 23, 2019 / Apr. 23, 2022 in Yesan. GWAS estimated the associated SNP locations for analyzed phenotype and genotype data by using FarmCPU that statistical model of the GAPIT.

[Results and Discussion]

Accession number 678 (heading date scoring: 1.125), 829 (2.25), 1234 (3.25), 676 (3.625), 842 (4), and 871 (4.875), were selected as the faster lines with lower scoring. SNPs were not overlapped with the 2019, 2022, and 2019-2022 average in the Rural Development Administration and KNU field. Among the six GWAS results, the most overlapping SNP markers are AX-95222044, AX-94954406, and we plan to search for useful candidate genes by investigating ± 250 kbp based on these SNP markers.

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