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Genome Wide Association Studies for Protein and Starch in Korean Cowpea Germplasm

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[Introduction]

Cowpea (*Vigna unguiculata* L. Walp., $2n=2x=22$) has dietary protein and essential nutrients for the people in sub-Saharan Africa, East-Asia, and other developing countries. Among them, cowpea protein and starch are high-quality sources of nutrition in legumes, with relatively low-fat content and higher essential amino acid content than other grains. The development of varieties with high nutrition content for protein and starch supply is one of the main goals of the genetic improvement in legumes.

[Materials and Methods]

In this study, a total of 384 cowpea germplasm were genotyped with 51K Cowpea iselect consortium array. After seeds were harvested in 2018~2019, their crude protein and starch content were determined using the Kjeldahl method and AOAC Method 996.11.

[Results and Discussion]

Protein and starch content of cowpea showed a negative correlation ($r = -0.574, -0.452$) in two years. Genome-wide association analysis (GWAS) used the Compressed Mixed Linear Model (CMLM) in GAPIT. A total of 75 SNPs were associated with protein and starch. Especially, chromosome 6 (33,657,667 bp) showed a significant association with both protein and starch. As a result, this SNP loci could be helpful to research the genetic and breeding program of cowpea.

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