Single Nucleotide Polymorphism Marker Development for Breeding of Onion (Allium cepa L.) Resistant to Botrytis squamosa

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Onion is a worldwide horticultural crop used in many purposes, such as various dishes and a variety of pharmacological activities. Botrytis squamosa is one of major pathogens damaging yields on onion by causing grey mold. For this reason, it is economically important to decrease damage by breeding resistant varieties for B. squamosa. However, it is difficult to breed resistant onion cultivars because of their biennial life cycle, their cross-pollinated nature and large genome size. To overcome these problems, identifying genetic characters using molecular markers for onions is more efficient. In this study, RNA sequencing of 4 resistant and 3 onion lines was conducted and variations were analyzed compared to the reference sequence. Gene Ontology analysis of each transcripts with polymorphic SNPs in resistant and susceptible lines was performed. Among clustered transcripts, photosynthesis-related genes were selected for High Resolution Melting (HRM) analysis, because it was known that photosynthesis-related genes were associated with disease resistance. HRM analysis was conducted with SNPs of photosynthesis-related genes and SNP markers, distinguishing resistance and sensitivity, were obtained. These markers are expected to make onion breeding efficiently by easily distinguishing resistance from susceptibility.