Development of SCAR Marker Discriminating ‘Hongro’ Apple and Its Bud Sport ‘Jahong’

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‘Jahong’ is a bud sport of ‘Hongro’. Due to morphological similarity between the mother plant and its bud sport, distinguishing cultivars with morphological traits is infeasible. DNA marker helps to protect breeders’ rights by distinguishing cultivars without morphological characterization. DNA variations were detected by comparing previously studied GBS data of ‘Hongro’ and ‘Jahong’. Sequence variations between ‘Hongro’ and ‘Jahong’ revealed polymorphic candidate regions, and 7 pairs of PCR primers were designed. Polymorphism of PCR amplicon was observed by agarose gel electrophoresis. As a result, a pair of primers (CBlm11i01i01) generated about 500 bp of additional PCR amplicon in ‘Jahong’, which was absent in ‘Hongro’, confirming the polymorphism between ‘Hongro’ and ‘Jahong’. In order to develop a marker specific to ‘Jahong’, a SCAR marker (CBlm11sc01) was designed through sequence analysis of a PCR amplicon of CBlm11i01, which was specifically identified in ‘Jahong’. PCR amplicons of ‘Hongro’ and ‘Jahong’ using CBlm11sc01 showed a specific PCR amplicon only in ‘Jahong’ when observed through agarose gel electrophoresis. Two pairs of primers CBlm11id01 and CBlm11sc01 developed in this experiment can clearly discriminate ‘Jahong’ from ‘Hongro’. These markers will contribute to the protection of breeders’ rights and be useful for apple breeding.

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