

Genetic Identification of Crop Cultivars Using Barcode System

Authors : Kesavan Markkandan, Ha Young Park, Seung-Il Yoo, Sin-Gi Park, Junhyung Park

Abstract : For genetic identification of crop cultivars, insertions/deletions (InDel) markers have been preferred currently because they are easy to use, PCR based, co-dominant and relatively abundant. However, new InDels need to be developed for genetic studies of new varieties due to the difference of allele frequencies in InDels among the population groups. These new varieties are evolved with low levels of genetic diversity in specific genome loci with high recombination rate. In this study, we described soybean barcode system approach based on InDel makers, each of which is specific to a variation block (VB), where the genomes split by all assumed recombination sites. Firstly, VBs in crop cultivars were mined for transferability to VB-specific InDel markers. Secondly, putative InDels in the VB regions were identified for the development of barcode system by analyzing particular cultivar's whole genome data. Thirdly, common VB-specific InDels from all cultivars were selected by gel electrophoresis, which were converted as 2D barcode types according to comparing amplicon polymorphisms in the five cultivars to the reference cultivar. Finally, the polymorphism of the selected markers was assessed with other cultivars, and the barcode system that allows a clear distinction among those cultivars is described. The same approach can be applicable for other commercial crops. Hence, VB-based genetic identification not only minimize the molecular markers but also useful for assessing cultivars and for marker-assisted breeding in other crop species.

Keywords : variation block, polymorphism, InDel marker, genetic identification

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