Molecular fingerprinting of newly developed soybean (*Glycine max* L. Merr.) cultivars

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ABSTRACT

Five soybean cultivars (Glycine max L. Merr.), obtained from Agricultural Research Center, Giza, Egypt, were tested for their SDS-storage proteins and PCR-RAPD (polymerase chain reaction-randomly amplified polymorphic DNA) markers. For PCR-RAPD analysis, ten arbitrary 10-mer primers were used. A total of 3 (17%) and 37 (39%) polymorphic bands were detected for protein and RAPD, respectively. The comparison between SDS-protein and RAPD analyses revealed that the latter gave more markers and more conclusive results. These molecular markers were sufficient to distinguish among the five cultivars. The cultivar-specific markers represented 18% of the total markers (regardless of type of analysis), 83% of them were RAPD markers. Most of these markers were scored for the presence of unique bands. Cultivar-specific markers detected by both analyses were shown to be useful in constructing a linkage map that involves any polymorphic gene(s). Two specific RAPD markers distinguishing the three Giza cultivars were detected indicating that they can be used as markers for the resistance against cotton leaf worm. Subsequent crossing might be needed to support this hypothesis. Dendrogram tree generated across the two types of analyses did not divide the five soybean cultivars into distinct clusters. However, closely related pairs of cultivars (with an average similarity of 0.90) were G21/G111 (average similarity of 0.93), Celest/G111 (average similarity of 0.92) followed by Crawford/G21 (average similarity of 0.91). The relationships among soybean cultivars derived from this study were not completely consistent with the known lineage of these cultivars, where conflicting relationships were detected with cultivar pairs G21/G35 and G111/G35, although they were all seem to be derived from the two common ancestors Celest and Crawford. The close relationship between cultivars G21 and G111 reflects that no much germplasm mixing happened during breeding programs. Two RAPD markers were shown to discriminate among the three Giza cultivars, which can be testerd for their linkage with the cotton leaf worm resisitance gene (s). In conclusion, RAPD markers are recommended in providing a quick and reliable discrimination technique, compared with the other types of analyses, to identify and distinguish between soybean cultivars.

Key words: Soyban, SDS-PAGE, RAPD, fingerprinting, molecular markers, cultivar indentification.