ABSTRACT

Five Egyptian bread wheat varieties, Sakha 93, Giza 168, Sids 1, Sids7 and Gemmeiza 9 were used in this study. A line x tester set of crosses were used to investigate the nature and magnitude of gene effects controlling SDS-sedimentation volume, protein content and grain yield characteristics and to determine their general and specific combining ability Six F_2 populations were developed to study genetic divergence generated in F_2 progenies and to identify molecular RAPD genetic markers for bread-making quality through bulked segregant analysis (BSA). The data revealed a wide range of variation for quality and grain yield attributes among parents and their progenies. Differences among the genotypes were highly significant for all studied quality and yield traits except grain protein content and number of grains per plant. The analysis of variance for combining ability revealed the predominant role of additive gene action including partial dominance in the expression of these quality attributes and yield components. The estimates of GCA effects had definite pattern and two the parents, Sakha 93 and Giza 168, were superior for all traits studied. The data indicated that there no specific cross combinations exhibited desirable SCA effects. The clustering pattern in F_2 wheat progenies was varied according to parental combination. Only six primers gave polymorphism with the studied genotypes. While only 5 primers develop molecular markers for positive and negative baking-quality performance. Primer D5 exhibited one positive molecular marker with

molecular size of 0.298 bp, which was found only in cross combination Giza 168 x Gemmeiza 9. Primer B10 exhibited one positive molecular marker with molecular size of 0.394 bp, which was found only in hybrid Giza 168 x Sids 1. These results indicated that these four positive RAPD markers could be considered reliable markers for bread-making quality in bread wheat. Several markers showed strong relationships with SDS-sedimentation volume, indicating that there are potential markers for use in marker-assisted selection to improve bread-making quality by molecular breeding.

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