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Heterosis and combining ability estimates in isoflavone content using different parental soybean accessions: wild soybean, a valuable germplasm for soybean breeding
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Isoflavone, a group of secondary metabolites in soybean, is beneficial to human health. Improving isoflavone content in soybean seeds has become one of the most important breeding objectives. However, the narrow genetic base of soybean cultivars hampered crop improvement. Wild soybean is an extraordinarily important gene pool for soybean breeding. In order to select an optimal germplasm for breeding programs to increase isoflavone concentration, 36 F1 soybean progenies from different parental accessions (cultivars, wild, Semi-wild and Interspecific) with various total isoflavone (TIF) concentration (High, Middle, Low) were analyzed for their isoflavone content. Results showed that male parents, except for Cultivars, showed positive GCA effects. In particular, wild soybean had higher positive GCA effects for TIF concentration. Both MP and BP heterosis value declined in the hybrid in which male parents were wild soybean, semi-wild soybean, interspecific offspring and cultivar in turn. In general, combining ability and heterosis in hybrids which had relative higher TIF concentration level parents showed better performance than those which had lower TIF concentration level parents. These results indicated characteristics of isoflavone content were mainly governed by additive type of gene action, and wild relatives could be utilized for breeding of soybean cultivars with this trait. A promising combination was found as the best potential hybrid for isoflavone content improvement.