DEVELOPMENT OF CANOLA GRADE INDIAN MUSTARD (*Brassica juncea)* VARIETY TO MEET THE EDIBLE OIL SECURITY AND CLIMATE CHANGE CHALLENGES IN BANGLADESH

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Abstract

Erucic acid >2% in mustard oil is considered as unhealthy as edible oil and anti-nutritional for human consumption. The existing all mustard varieties of Bangladesh contain 40-48% erucic acid, which is a big concern for food and nutritional security and safety of the country. Hence, to develop canola grade mustard variety, six Bangladeshi *Brassica juncea* mustard variety were crossed with a canola grade double zero *B. juncea* line in 7×7 half diallel fashion. The developed 21 F_1 hybrids along with their parents were evaluated for yield contributing traits and fatty acid compassions. High narrow sense heritability was observed in days to pod maturity, while plant height, days to first flowering and seeds per siliquae showed moderate narrow sense heritability. The parental lines, P1, P3 and P4 were found as the best general combiner for earliness and dwarfness and, P2 and P7 showed the best combiner for yield contributing traits. Whereas, the hybrid lines, G3, G11 and G13 indicated the best specific combiners for yield attributes, and the crosses, G6, G17 and G21 found for early maturity. The hybrid G3, G5 and G17 manifested the highest heterosis for early maturity over the check variety BARI sharisha 11. In the fatty acid compositions analysis, the crosses G19-S4, G5-S1 and G21-S1 contained low erucic acid. In hybrids, total saturated fatty acid and mono-unsaturated fatty acid was ranged from 10.81% to 16.53% and 40.60% to 59.18%, respectively. The highest ratio of oleic acid (ω-9) to linoleic (ω-6) acid was found in P6, G5-S1 and G19-S4. Moreover, P6, G19-S4 and G19-S2 showed the highest ratio of linoleic (ω-6) to linolenic (ω-3) acid. The selected F_1 hybrid lines were further backcrossed to the selected Bangladeshi parents to reduce the growth duration and the seven types of BC_1F_1 and BC_2F_1 lines were developed. Altogether, the hybrids viz., G4, G5, G7, G11, G17, G19, G21 and lines of BC_1F_1, BC_1F_2 and BC_2F_1 could be utilized to develop early matured, high yielding low erucic acid containing improved mustard variety.

Key words: low erucic acid, canola-grade, saturated and unsaturated fatty acid, breeding lines, climate change, *Brassica juncea*