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Enhancing parental lines for oil and meal quality to develop CMS based canola hybrids in Indian mustard (Brassica juncea L.)

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Canola mustard has been commercialized in India with the release of the first variety, RLC 3. We are now pursuing Canola mustard hybrids to make this crop more attractive for farmers in terms of crop productivity. Our experience with conventional ogura CMS based mustard hybrids have shown that the heterosis was maximum in crosses involving Indian and east Europeon germplasm lines. We initially identified productive genotypes from Indian gene pool and converted these into CMS lines by backcross substitution into ogura cytoplasm. For development of restorer lines, relatively early maturing east Europeon genotypes were selected for simultaneous conversion into canola quality as well as introgression of fertility restorer gene(Rfo). For this, two way crossing programme was designed. In the first set of crosses, restorer lines (NAR) were crossed with canola mustard lines ('00'). In second set of crosses, F1's were produced between east European lines (EE) and canola mustard lines ('00'). Then F2 generation was raised from hybridizing between two sets of F1's. Plants segregated for sterile/fertile and canola quality traits. Agronomically superior fertile plants were selfed as well as test crossed with ogura CMS lines to confirm presence of Rfo. Marker assisted selection for meal glucosinolate [J2Gsl1(GER1), J3Gsl2 (GER5), J9Gsl3 (5G41 and 5GAJ67), J17Gsl5 (Myb 28)] was carried out in the progenies of fertile plants. In next generation (F3), plant to progenies rows were raised from selected plants. Marker assisted selection was again practiced for Rfo and low glucosinolates. Relative homozygosity for agrnomic traits, canola quality and Rfo presence was achieved by F4/F5 generations. Of these, one fertility restorer line (OCRE-4NR) produced heterotic hybrid in combination with Canola CMS line, ZM 20. The hybrid, RCH-1, yielded 2.57 t/ha on the basis of averages over seven research trials. This indicated a yield superiority of 23.5 per cent over commercial check variety RLC 3 (2.08 t/ha).