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Characterization of Cytoplasmic Male Sterile Lines of *Brassica oleracea* var. *botrytis* using mitochondrial-DNA specific markers

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Snowball or European summer cauliflower (*B. oleracea* L. var. *botrytis*) is the main vegetable crop in Indian sub-continent cultivated during winter season. However, this crop is now cultivated year round after development of high temperature tolerant cultivars and hybrids. Cytoplasmic male sterile (CMS) system is the most attractive and widely used mechanisms in hybrid seed production of *B. oleracea* vegetables. CMS, which is determined by plant mitochondrial genomes, is associated with the failure to produce functional pollen, and many mitochondrial genes that govern CMS can be suppressed by the products of one or more nuclear genes known as fertility restorer genes (*Rf*). At least 14 mitochondrial genes that determine CMS have been characterized as open reading frames (*ORFs*) comprising segments derived from mitochondrial gene-coding and gene-flanking sequences and from sequences of unknown origin. Many cytoplasmic male sterility (CMS) systems have been elaborated in the cultivated *Brassica* species viz. *pol*, *ogu*, *tour*, *nap*, *hau*, *Shan 2A*, *Moricandia arvensis* etc. However, so far, the most widespread system used in *Brassica oleracea* hybrid breeding is the improved Ogura CMS. Currently the work on transfer of other CMS systems to *B. oleracea* is in progress and characterizing cytoplasmic sources employing mitochondrial markers is relevant to future studies on possible origins and molecular mechanisms of CMS in *B. oleracea*. Hence, in the present study cytoplasm sources of about 70 different CMS lines including CMS hybrids of cauliflower were analyzed using mitochondrial DNA-specific markers. All the CMS accessions contained the ogura specific '*orf138*' related DNA fragment. However, polymorphic amplicons were also obtained in CMS accessions by two of the polymorphic mitochondrial primers. The mitochondrial markers identified here could be useful in detecting origin of CMS types during cauliflower breeding and further investigating mitochondrial-nuclear interactions leading to CMS in *Brassica oleracea*.

Biography

Saurabh Singh, currently Ph.D. scholar at IARI, New Delhi, India, is working on Genetic studies on snowball cauliflower (*B. oleracea* var. *botrytis*) using CMS and DH lines. He has also standardized the doses of NaCl sprays for the maintenance of S-allele lines of *B. oleracea* during M.Sc. programme. Current research focus is on study the heterosis using CMS and DH lines in cauliflower and agronomic and molecular characterization of CMS lines and confirming the origin of cytoplasm types in the CMS lines of cauliflower using mitochondrial markers. He has also published 6 research papers/review papers and one book chapter with CRC press USA.

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