



NATIONAL RESEARCH CENTRE ON PLANT BIOTECHNOLOGY



MUSTARD HYBRIDS

A SUCCESS STORY

Introduction

Brassica juncea (Indian mustard) is the most important oil seed crop of northern India. It is cultivated on ca. 6 million ha and contributes approximately 5.8 million tons to the oilseed pool of India. The productivity of mustard in India is low with an average yield about 1 ton/ha. Intervarietal crosses show 30-60% heterosis for yield. Hence, development and deployment of hybrids could lead to increased production and productivity. The crop is ideally suited for hybrid production as it is amenable to cross pollination by honeybees. However, the development of hybrid cultivar has not been feasible until recently due to lack of suitable genetic stocks for commercial hybrid seed production.

At NRCPB (erstwhile Biotechnology Centre, IARI), biotechnological tools were successfully employed to increase productivity of mustard. Other than developing mustard variety Pusa Jai Kisan through somaclonal variation, NRCPB has also made great strides towards development of hybrid mustard technology by developing several genetic stocks for aiding commercial hybrid seed production.



Technique used

In Indian mustard, the Centre has developed, for the first time, cytoplasmic male sterile (CMS) and fertility restorer lines and thus paved the way for hybrid cultivar development. Making use of modern biotechnological tools for wide hybridization, somatic and sexual hybrids were produced between mustard and several of its wild allies. By further processing of these hybrid derivatives, several novel CMS systems of Indian mustard have been developed involving cytoplasm of wild relatives such as *Brassica oxyrhina*, *Diplotaxis catholica*, *D. berthautii*, *D. eruroides*, *Trachystoma ballii* and *Moricandia arvensis*-based CMS and fertility restorer lines have been distributed to mustard breeders for developing commercial hybrids.

Follow up and Hybrid Mustard Development

The CMS and fertility restorer lines have been registered with the National Bureau of Plant Genetic Resources, New Delhi and shared with the mustard breeders in ICAR (IARI, New Delhi; NRC on Rape Seed Mustard, Bharatpur) and State Agricultural Universities (CCSHAU, Hissar; PAU, Ludhiana; GBPUA&T, Pantnagar), for developing hybrid cultivars. Further, some of the CMS lines have also been licensed to private companies for development of hybrids.

In 2009 the first mustard hybrid NRC Sankar Sarson developed by the Directorate of Rapeseed and Mustard Research, Bharatpur based on *Moricandia arvensis* CMS system was identified for release by the Central Variety Release Committee. Another hybrid Coral 432 developed by *Advanta India* a private company based on a CMS line developed at NRCPB, was approved for release in 2010. The new CMS sources are also being used to develop hybrids in cauliflower.