BCIL Biotech Consortium India Limited

DMH-1 Hybrid Mustard Technology

TECHNOLOGY AVAILABLE FOR TRANSFER

Need of Opportunity

Development of hybrid varieties through exploitation of heterosis has enhanced productivity in many crop plants. *Brassica juncea* (oilseed mustard), a major oilseed crop of the Indian subcontinent, has two divergent gene pools (Indian and east European). Single cross hybrids between the lines of the two gene pools are significantly heterotic for yield. However, hybrid seed production at commercial scale has been a major challenge in mustard crop due to non-availability of proper pollination control mechanism such as male sterility and restorer systems.

The current invention highlights the development of a hybrid in mustard, named DMH-1, based on a novel CMS-restorer system which is highly amenable to commercial hybrid seed production.

About the Technology

This technology refers to the seeds of the three lines of DMH-1 viz A (Male-sterile line), B (Maintainer line) and R (Restorer line) of the hybrid mustard based on a novel CMS (cytoplasmic male sterility) restorer system.

DMH-1, the '126-1' CMS based hybrid, was developed between Indian cultivar Pusa bold and a canola quality east European line, EH-2. DMH-1 is taller than Indian varieties (~200cm), has high number of primary and secondary branches which bear a large number of pods, a character inherited from the east European parent. Tip sterility of the inflorescence is negligible. The pods are thin walled and on an average contain ~15 seed each with a test weight of about 4.1gm. It matures about 7-10 days earlier than major Indian varieties.

Validation

Extensive farmers' field demonstration trials in the north and northwestern mustard-growing belt of India have been conducted during the study period. The farmers field demonstration trials were conducted in approximately 4000m^2 plot each for DHM-1 and check varieties. Average heterosis of 35.6% was recorded in 2004-05 and 28.5% in 2005-06. The results of farmers field demonstration trials have been shown in Table 1. Besides monitored trials, DMH-1 was grown in about 496 acres of land during 2005-06 where the farmers were provided the seed and suggested a broad package of practices. An average yield heterosis of 18% was recorded from these trials. Maximum yield potential of the DMH-1 hybrid was recorded as 3.29 tonnes/hectare in the field demonstration trials and 3.78 tones/ hectare in the minikit trials.

Table 1. Average yield performance of DMH-1 in multi-site farmers' field demonstration trials conducted for two years.

Locations	2004-05				2005-06			
	Number of trials	Yield kg/ha		% heterosis	Number of trials	Yield kg/ha		% heterosis
		Check	DMH-1			Check	DMH-1	
Bharatpur (Rajasthan)	4	1522	2054	35	6	2285	2915	27
Agra (UP)	4	2127	2568	21	4	2027	2515	24
Rewari (Haryana)	2	1759	2654	51	4	2040	2425	19
Alwar (Rajasthan)	-	-	-	-	4	1985	2515	27
Morena (MP)	-	-	-	-	4	2070	2675	29
Sri Ganganagar (Rajasthan)	-	-	-	-	5	1775	2570	45

UNIQUE SELLING PROPOSITION

- First hybrid Mustard Variety of India.
- The hybrids were found to be highly resistant to white rust and significantly tolerant to Alternaria blight in comparison to widely grown cultivars of mustard in India.
- The oil content of DMH-1 is ~40%.

STAGE OF TECHNOLOGY

- Fully developed technology with ready lines of DMH-1 variety for production and marketing.

LICENSING OPPORTUNITY

BCIL is looking for a suitable industrial partners for commercialization of DMH-1 Hybrid Mustard Technology.

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