

## SHORT COMMUNICATION

**Development of Introgressed Lines with Unique Characteristics in *Brassica carinata*****VV Singh, Rajbir Yadav, SS Meena, Vandana Verma and Arvind Kumar**

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Three lines of *Brassica carinata* 08-304, 08-312, 08-316 derived from inter specific hybridization were evaluated for morphological traits during 2007-08 and 2008-09. These lines showed significant increase in shoot length, 1000-seed weight and significant decrease in maturity duration as compared to check Kiran. Development of these lines is important for Karan rai improvement programme in India.

**Key Words:** *Ethiopian mustard*, Interspecific hybridization, Introgressed lines

Karan rai or Ethiopian mustard (*Brassica carinata* A. Braun) is a mustard crop suitable for rainfed and low moisture condition. It is a natural amphidiploid between *B. nigra* and *B. oleracea* and believed to be originated in Ethiopian highlands. Besides its tolerance to moisture stress, Karan rai is a reservoir of number of disease resistant genes prevalent in India like white rust, *Alternaria* blight and stem rot (Malik, 1990; Getinet *et al.*, 1996). Despite such advantages, this crop could not find favour with farmers largely being a long duration crop along with other inherent shortcomings like low test weight, short shoot length etc. Most of its agronomic features suit rainfed conditions. However, in India, rapeseed-mustard is now largely grown on conserved moisture with one life saving irrigation. Therefore, the variety should possess the characteristics which suit this kind of agronomy. Looking into these considerations, the present investigation was planned to transfer some desirable agronomic traits from *B. juncea* in the genetic background of *B. carinata*.

The present investigation was initiated during the year 1999-2000 at NRCRM, Bharatpur, where an interspecific hybridization programme was planned. One of the released varieties of Indian mustard, namely, Varuna was crossed with a germplasm line of *B. carinata*. Pedigree bulk method was carried out and evaluation of plant to row progenies was followed during subsequent years. Segregating progenies of interspecific crosses were carried to F<sub>6</sub> stage through selfing. During Rabi 2006-07, rigorous selection was done at F<sub>6</sub> stage on the basis of plant type. The selection criterion was mainly on the basis of plant type. The plant showing *juncea* type features were retained in one group and those showing *carinata* types having introgression features (on the basis of plant type) from *juncea* background were kept in

another group. The third group was of pure *carinata* type where no visible symptoms of introgression from *juncea* background were noticed. The plants showing introgression features were selfed and grown in 4 rows of 4 m length during Rabi 2007-08 along with check variety Kiran (check of *carinata*). Three lines showing desirable features like early maturity, long shoot and bold seeds were isolated from group of introgressed lines and characterized for morphological features and harvested separately. These lines were found true to the type. These introgressed lines were again sown during Rabi 2008-09 along with Kiran in 5 rows of 5 m length with two replications. The observations were recorded on sample of 5 plants and then averaged over the two years 2007-08 and 2008-09. Student t-test (Sharma, 1998) was applied to test the significance of difference between means of check variety and introgressed lines. Rating of entries for reaction to *Alternaria* blight and white rust was done as per scale given by Conn *et al.* (1990).

The average mean and range of introgressed lines 08-304, 08-312 and 08-316 for different morphological traits along with check Kiran has been presented in Table 1. Perusal of data indicated that all the three lines flowered and matured earlier than the control. The maturity of these lines is significantly different from the control. Line 08-314 matured earlier followed by 08-316 and 08-312. Further, days to maturity showed a positive correlation with days to flowering initiation. Main shoot length of Karan rai is short but introgressed lines reported here showed main shoot length up to 78.1 cm (08-304) in comparison to control (38.5 cm) followed by 08-316 (65.2 cm) and 08-312 (62.3 cm). Main shoot length of these lines was also significantly different from the control. Another yield component in

**Table 1. Characterization (average mean of 2007-08 and 2008-09) of introgressed lines with unique characteristics in *Brassica carinata***

Line	PH	DFI	DM	FZL	MSL	PB	S/P
08-304	158-164(161.4)	42.5-43(42.7)*	141.5-143(141.7)*	84.5-94.5(87.5)	67.5-83.5(78.1)*	6.5-8(7.1)	284-384.5(338.9)
08-312	173-194(183.4)	58.5-61(59.8)*	145.5-146.5(146)*	72-100(84.4)	53.5-69(62.3)*	6.5-11.5(8.9)	291.5-406.5(343.8)
08-316	166-184(174)	57-59(58)*	142.5-144 (143.2)*	83.5-90(85.6)	56.5-76(65.2)*	9-11.5(9.7)	344.5-437.5(385.5)
KIRAN	180-198(186.6)	75-76.5(76)	152-154.5(153.3)	58.5-74.5(65.9)	35-43(38.5)	8.5-13.5(11.5)	317.5-407.5(351.1)
Line	S/S	1000-SW	OC	Disease reaction			
				AB	WR		
08-304	14-16.5(15.7)	4.4-5.6(4.9)*	38.5-40.7(39.5)	2	0		
08-312	12-15(13.7)	3.7-4.0(3.91)*	40.0-41.6(40.6)	1	0		
08-316	12.5-16(14.5)	2.7-2.8(2.79)	39.8-41.7(40.7)	1	0		
KIRAN	14.5-17(15.1)	2.9-3.2(3.02)	38.6-40.5(39.3)	1	0		

\* = Significantly different from control plant, Figures in parenthesis indicates mean of the character

(PH=Plant height, DFI=Days to flowering initiation, DM=Days to maturity FZL=Fructing zone length, MSL=Main shoot length, PB=Primary branch, S/P=Siliqua/plant, S/S=Seed/siliqua, SW=Seed weight, OC=Oil content, AB=*Alternaria* blight, WR= White rust)

this crop is 1000-seed weight, the line 08-304 recorded maximum 1000-seed weight of 4.90 g in comparison to control (3.02 g) followed by line 08-312 which is also significantly different from the control. However, line 08-316 has low 1000 seed weight which is lower than the control. The reduction in days to flowering initiation and days to maturity, increase in main shoot length and 1000-seed weight in these introgressed lines are desirable features from agronomic point of view of *B. carinata* cultivation in India and may be attributed to transfer of desirable gene complexes from *B. juncea* background through interspecific hybridization. Further, reaction of these lines to diseases, *i.e.*, *Alternaria* blight and white rust is comparable to check Kiran except line 08-304 for AB reaction (Table 1). On the basis of this study, it can be concluded that line 08-304 and

08-312 can be used as a genetic stock for early maturity, long main shoot and 1000-seed weight while line 08-316 can be used as a donor for early maturity and long main shoot in Karan rai improvement programme.

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